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UNITED STATES DEPARTMENT OF AGRICULTURE

DEPARTMENT BULLETIN No. 1230

Washington, D. C. ▼ April, 1924

CONDITIONS AFFECTING THE DEMAND FOR HARVEST LABOR IN THE WHEAT BELT

By

DON D. LESCOHIER, Collaborator, Bureau of Agricultural Economics

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By Don D. Lescohier, *Collaborator, Bureau of Agricultural Economics.*

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INTRODUCTION.

Wheat is grown in areas of sparse population, usually ranging from 4 to 16 persons per square mile. During harvest and threshing, farmers in these wheat areas find it necessary to hire much extra labor. On the average, the wheat farms double their labor force during the harvest. (See Table 1.) The cities and towns within the wheat belt are not able to furnish such a large amount of extra labor. Kansas City, St. Joseph, Omaha, and the other centers of concentrated population scattered through the eastern portion of the winter wheat States (Texas, Oklahoma, Kansas, Nebraska) can but partly meet the labor needs of the harvest period. The Dakotas have no near-by area upon which to draw and are entirely dependent upon more distant centers of population. Consequently the wheat belt finds it necessary each year to attract labor from considerable distances to the harvest. The financial success of the wheat farmers depends largely upon their ability to secure this labor in adequate quantities and at reasonable prices.

Each year a forecast must be made of the amounts of labor that will be needed in the several wheat States and definite efforts made to attract the required number of men to them. These forecasts must be made six or eight weeks before the grain is ready to cut to afford time for the necessary advertising for men. Up to the present time the forecasts in most States have been hardly more than guesses.

[1] Josiah C. Folsom, Bureau of Agricultural Economics, gave valuable assistance in the preparation of this report for publication.

The agricultural authorities of Kansas have worked out the only available formula for computing prospective labor needs. This formula, properly modified, may become the means for more accurate forecasts of harvest labor needs.

The Kansas formula was intended for use only in "header territory" and is as follows:

$$\frac{A}{50} - (mf + mt) = mo,$$

in which A = number of acres of wheat to be harvested within a county. The figure "50" used in the first terms signifies an assumption that each man working in the harvest will, on the average, harvest 50 acres of grain. mf = man power of the farms (number of farms multiplied by 1.5, which signifies there are resident on each farm 1.5 persons, including family labor and month hands, who will work in the harvest).[2] mt = man power available from towns within the county. mo = number of men needed from outside the county.

The authors of the formula state, in further explanation, that it is assumed in the formula "that a crew of six men harvests about 300 acres, or about 50 acres per man for the season. All small grains should be included in the formula if they conflict in date with the wheat harvest. If other farm work, with crops or livestock, must be done during the harvest season, more men must be allowed for that purpose in the formula. The amount of straw to be moved has a material effect on the amount of labor required. When grain all ripens about the same time, more labor is required to handle all the fields just at this opportune date. When the wheat ripens less evenly, binders can be used on a larger acreage and the same crew may be able to cut several fields in succession without hiring more men. Help may sometimes be used in one part of the State and later in another part. It is quite common for some laborers to finish harvesting in southern Kansas in time to get into another run in the northwestern corner of the State. In some years, however, the wheat all ripens at nearly the same date throughout the State and neighboring States, and it is not possible for a man to work in two parts of Kansas. Kansas has been, during some years, in competition with Oklahoma and Nebraska at the same date."[3]

The quotation makes clear that those who prepared the formula know that it must be applied with care and judgment. It is but a rough estimate of the labor needs. *If the total amount of labor needed by each county is computed with the formula and then the county totals are added to get the total needed by the State, the result will ordinarily be a considerable overestimate of the State's demands.* Officials importing labor for the State as a whole will find it necessary to consider carefully the extent to which harvest hands are able to work in more than one county before combining the county totals into a State total.

The writer has reached the conclusion, after a careful study of the actual amounts of labor used to harvest 1,291 wheat farms in the

[2] The Kansas formula is also discussed in Harvest Labor Problems in the Wheat Belt, by D. D. Lescohier, U. S. Department of Agriculture, Bulletin 1020, and Kansas Handbook of Harvest Labor, Kansas State Agricultural College Extension Circular 23, Manhattan, Kans.

[3] Kansas Handbook of Harvest Labor. op. cit.

harvest of 1921, that the formula itself can be made more accurate; and that, properly modified, the formula can be adapted for use in computing the labor needs of wheat areas which use either the header or the binder for harvesting. In its original form it was intended for use only in "header" territory.

PURPOSE AND METHODS OF THE STUDY.

The purpose of the present bulletin is to test the accuracy of this formula and to determine the adjustments necessary to fit it for use in areas where the binder predominates or where the header predominates. In short, the task involves a study of the various factors which influence the demand for extra labor in harvest and threshing periods, such as the different kinds of machinery, different methods of farm management, and different systems of cropping. The accuracy of the Kansas formula is tested, and adaptations necessary to fit it for use in areas where the binder predominates are suggested.

The facts cited were obtained from farmers and threshermen by visiting wheat farms in Oklahoma, Kansas, Nebraska, the two Dakotas and Minnesota, during the harvest and threshing season of 1921. Starting from Wichita, Kans., on June 26 by automobile, two investigators worked through Sedgwick and Harper Counties, Kans., into Woods and Alfalfa Counties, Okla., then northwestward through the big wheat counties of Kansas to Colby, and eastward across southern Nebraska to Grand Island, then drove directly to Redfield, S. Dak., and worked eastward from Redfield and Aberdeen across northern South Dakota into Big Stone County, Minn.

Meanwhile another group of investigators began work at Lincoln, Nebr., and visited wheat farms in east-central and northeastern Nebraska and southeastern South Dakota. On August 1 the two groups entered North Dakota and spent the entire month in North Dakota and in the Red River Valley section of Minnesota, covering 17 Dakota counties and six Minnesota counties during the month.

When these two groups had completed their work they had studied the wheat farmer's harvest and threshing labor problems in 66 of the most important wheat counties of the United States.

The facts thus obtained were supplemented and checked by another member of the staff who interviewed Federal, State, and county agricultural and employment office officials, and gave special attention to the factors controlling the total demand for harvest labor and to the experiences of the various officials in the importation and distribution of harvest hands.

SELECTION OF COUNTIES VISITED.

Table I of the Appendix shows the counties in which detailed data were obtained from farms. These counties were carefully selected as representative of the labor and farm-management problems of the wheat belt. Woods and Alfalfa Counties, Okla., and Sumner, Sedgwick and Harper Counties, Kans., were taken as typical representatives of southern winter wheat areas where the binder predominates or is used as commonly as the header. In the other counties visited in Kansas, as well as in Hitchcock and Redwillow Counties, Nebr., the header is used for harvesting, with an increased number of farms using combines, or header-threshers. The types of harvesting machinery used had less effect upon the selection of counties in the spring

wheat area, since the binder is used there almost exclusively. A few headers are scattered through northern South Dakota. None is used in North Dakota.

The density of population, distance from or access to centers of labor supply, degree of crop diversification, geographic distribution of rainfall, and size of farms were some of the other factors determining the choice of counties. Care was taken to include counties of old native white stock, counties with a considerable number of immigrant farmers, and the counties in Kansas in which negroes were engaged in wheat farming. Nearly one-fourth of the farmers interviewed were renters in Kansas and the Dakotas. These percentages of tenancy correspond closely with the amount of tenancy in the States visited. Tenancy did not appear, however, to have any appreciable effect upon the labor question. Comparison of the labor practices of tenant farmers and farm owners in the same areas did not reveal any differences that could be attributed to tenancy.

In the counties selected for study every farm, big or little, prosperous or run-down, found along the roads traveled, was visited, and both main highways and side roads were included in the routes. Many farmers were absent from home when visited and in such cases the investigators went on to the next farm. When an area had been sufficiently sampled they moved on to another county.

ACREAGE AND CROPS OF FARMS VISITED.

One thousand two hundred and ninety farms visited harvested 271,995 acres of wheat on a total farm acreage of 702,795 acres. (Tables I and II of the appendix.) Wheat constituted 63.2 per cent of the total cultivated acreage of these farms. (Table II of the appendix.) The farms averaged 545 acres in size, and wherever wheat is the main crop there always is a strong tendency toward large-scale farming. Indeed, 73.4 per cent of the farms visited exceeded 240 acres in area and almost one-half of them exceeded 320 acres. (Table I of the appendix.) The farms visited, however, were of all sizes, ranging from less than 160 acres to 110,000 acres, and including a representative group of each size.

Table II of the appendix shows the distribution of the farm acreage between various crops. In the last column of the table it will be noted the percentage of the cultivated acreage planted to wheat in the Kansas and Oklahoma counties was much higher than in the other States. This is in part due to the fact that the counties visited in Kansas and Oklahoma were all located in the "wheat belt" of those States, while in Nebraska, the Dakotas, and Minnesota it was possible to visit areas of other types. If eastern Kansas had been covered to the extent that the eastern sections of Nebraska and of the Dakotas were covered, corn would have exerted a larger influence on the figures obtained from Kansas.

Next to wheat, oats was the most important crop in North Dakota and Minnesota, but in Nebraska and South Dakota corn was relatively the more important. In North Dakota and Minnesota a considerable acreage of barley was also encountered, and the combination of wheat, oats, and barley must be considered when comparing the harvest labor demand of North Dakota with that of central and western Kansas.

AMOUNTS OF LABOR USED IN THE WHEAT HARVEST.

Table 1 shows the amount of labor actually used in the 1921 harvest per 100 acres of wheat harvested and per 100 acres of small grain harvested. Properly correlated with the available information on the acreage to be harvested, the dates when each county is ready to harvest, and the amount of local labor available, it can be used in computing the amount of labor required for the harvest in each State.

The table shows that in areas such as Oklahoma and Kansas where wheat and small grains constitute the main source of farm income, the amount of family labor available per 100 acres of grain is relatively small. The farmer's family furnished less than 40 per cent of the total harvest force. And since the farmer's family does not vary in size in proportion to the size of his farm, the larger the farm, the smaller the amount of family labor per 100 acres harvested.

TABLE 1.—*Labor resident on 1,289 wheat farms and hired labor, and amount of labor used at harvest time per 100 acres of wheat, and per 100 acres of wheat, oats and rye, classified by counties.*

State and counties in which farms were located.	Total cultivated acreage of farms.	Per cent wheat constituted of total cultivated acreage.	Per cent wheat, oats, and rye constituted of total cultivated acreage.	Total number laborers on farms at harvest time.	Number of laborers per 100 acres.		Per cent of total labor force in the wheat harvest that consisted of—		
					Wheat, oats, and rye.	Wheat.	Family labor.	Month and year hands.	Harvest hands paid by day.
Oklahoma.									
Woods	14,974	89.5	92.0	282	2.05	2.10	34.4	1.7	63.9
Alfalfa	5,928	81.8	87.3	110	2.12	2.27	27.3	7.2	65.5
Total	20,902	87.3	90.7	392	2.07	2.15	32.4	3.4	64.2
Kansas.									
Sumner	9,661	76.9	85.6	151	1.83	2.03	41.7	15.3	43.0
Sedgwick	149	80.5	90.6	1	.74	.83	100.0	.....	.....
Harper	4,943	81.4	91.1	63	1.40	1.57	50.8	7.9	41.3
Barber	8,855	68.9	74.6	108	1.64	1.77	37.9	9.3	52.8
Comanche	7,525	91.8	93.6	118	1.68	1.71	29.6	1.8	68.6
Clark	5,900	82.2	85.3	75	1.49	1.55	36.0	1.4	62.6
Ford	14,810	84.9	87.7	208	1.60	1.65	30.2	9.8	60.0
Edwards	2,659	88.6	91.2	47	1.94	2.00	40.5	4.2	55.3
Pawnee	16,766	84.8	87.6	208	1.42	1.46	40.8	3.5	55.7
Barton	2,109	85.8	88.0	23	1.24	1.27	39.2	4.3	56.5
Ellis	10,913	79.9	81.5	164	1.84	1.88	42.6	3.8	53.6
Trego	5,706	88.8	90.5	63	1.22	1.24	46.0	6.4	47.6
Graham	7,529	63.6	66.3	92	1.84	1.92	39.2	2.2	58.6
Sheridan	8,917	74.7	78.2	96	1.38	1.44	47.0	7.2	45.8
Thomas	17,601	89.3	91.4	123	.76	.78	47.1	3.4	49.5
Total	124,043	81.7	85.2	1,540	1.46	1.52	39.8	5.5	54.7
Nebraska.									
Redwillow	8,855	79.4	81.2	65	.90	.92	93.8	4.6	1.6
Hitchcock	4,815	63.2	65.2	21	.67	.69	100.0	.....	.....
Furnas	2,270	59.0	61.9	16	1.14	1.19	87.5	.....	12.5
Kearney	1,205	53.5	59.3	8	1.12	1.24	100.0	.....	.....
Adams	530	59.4	78.3	7	1.69	2.22	57.1	.....	42.9
Clay	3,576	44.5	57.0	51	2.50	3.20	52.7	15.9	31.4
Hamilton	2,281	34.9	48.3	34	3.09	4.27	55.8	11.8	32.4
Fillmore	4,186	42.1	57.8	44	1.82	2.50	52.3	13.6	34.1
Seward	864	20.8	45.9	19	4.79	10.56	63.1	5.3	31.6
York	1,353	45.5	58.0	23	2.93	3.74	52.2	13.0	34.8
Lancaster	6,274	31.4	44.9	97	3.44	4.93	50.5	34.0	15.5
Saline	1,691	39.7	53.1	22	2.45	3.28	59.0	9.2	31.8
Saunders	1,807	35.7	48.9	28	3.17	4.33	53.5	21.5	25.0
Dodge	3,522	30.1	51.2	53	2.94	5.00	45.3	24.5	30.2
Total	43,229	50.1	60.2	488	1.88	2.25	62.0	17.2	20.8

TABLE 1.—*Labor resident on 1,289 wheat farms and hired labor, and amount of labor used at harvest time per 100 acres of wheat, and per 100 acres of wheat, oats and rye, classified by counties*—Continued.

State and counties in which farms were located.	Total cultivated acreage of farms.	Per cent wheat constituted of total cultivated acreage.	Per cent wheat, oats, and rye constituted of total cultivated acreage.	Total number laborers on farms at harvest time.	Number of laborers per 100 acres—		Per cent of total labor force in the wheat harvest that consisted of—		
					Wheat, oats, and rye.	Wheat.	Family labor.	Month and year hands.	Harvest hands paid by day.
South Dakota.									
Union	1,600	54.4	62.2	39	3.92	4.48	43.6	23.1	33.3
Clay	1,994	16.0	37.6	11	1.47	3.44	81.8	9.1	9.1
Yankton	836	00.0	26.4	13	5.88	.....	53.8	23.1	23.1
Kingsbury	327	10.7	41.3	2	1.48	5.71	50.0	50.0	.....
Clark	7,319	17.3	38.8	81	2.85	6.40	49.5	28.3	22.2
Spink	14,447	65.6	73.7	150	1.41	1.58	37.4	22.0	40.6
Brown	20,308	57.7	70.6	245	1.71	2.09	31.8	22.0	46.2
Marshall	5,657	57.8	66.6	73	1.94	2.23	41.1	21.9	37.0
Day	6,019	54.2	67.7	81	1.99	2.48	45.6	14.9	39.5
Roberts	2,665	41.3	59.3	26	1.64	2.36	77.0	15.3	7.7
Total	61,172	51.2	64.3	721	1.83	2.30	40.9	21.6	37.5
North Dakota.									
Dickey	9,841	42.9	62.5	113	1.84	2.68	35.4	17.8	46.8
Sargent	5,845	38.0	55.5	45	1.39	2.03	40.0	33.3	26.7
Cass	11,838	68.1	80.4	169	1.77	2.10	25.4	23.8	50.8
Traill	5,583	60.3	72.1	57	1.42	1.69	45.6	15.8	38.6
Grand Forks	8,432	69.3	78.6	95	1.43	1.63	44.2	21.1	34.7
Walsh	4,128	53.8	73.4	54	1.78	2.43	44.5	18.5	37.0
Pembina	6,400	62.2	85.2	81	1.48	2.04	47.0	29.5	23.5
Barnes	2,123	63.4	78.7	40	2.40	2.97	25.0	15.0	60.0
Stutsman	17,950	56.4	73.9	144	1.09	1.42	47.2	22.2	30.6
Foster	7,528	66.6	79.1	94	1.58	1.88	21.3	37.2	41.5
Eddy	6,066	56.0	79.3	44	.91	1.30	47.6	22.9	29.5
Griggs	5,652	60.2	82.8	81	1.73	2.38	27.2	27.2	45.6
Benson	9,431	67.9	86.1	76	.94	1.19	44.7	15.8	39.5
Ramsey	9,790	63.8	76.7	130	1.73	2.08	21.5	28.5	50.0
Towner	6,013	65.1	84.8	62	1.22	1.58	21.0	27.4	51.6
Cavalier	13,009	54.9	84.1	139	1.27	1.95	32.4	29.4	38.2
Pierce	7,655	54.3	88.1	68	1.01	1.64	48.5	14.7	36.8
Total	137,284	59.0	77.8	1,492	1.40	1.84	35.2	24.2	40.6
Minnesota.									
Big Stone	4,789	38.1	56.8	55	2.02	3.01	52.7	20.0	27.3
Stevens	1,029	33.7	52.7	9	1.66	2.60	100.0	.....	.....
Polk	9,861	47.6	72.1	136	1.91	2.90	40.4	15.6	44.0
Marshall	7,084	55.6	80.8	74	1.29	1.88	47.3	5.4	47.3
Roberts	118	.....	29.7	3	.....	.....	33.3	.....	66.7
Kittson	930	61.3	81.7	8	1.05	1.40	75.0	12.5	12.5
Total	23,811	47.8	71.0	285	1.69	2.50	47.4	13.0	39.6
Grand total	410,441	64.6	76.4	4,918	1.53	1.81	40.6	15.0	44.4

The table also clearly shows that the number of year hands and crop-season hands (labor hired for the entire summer at month wages) resident on the farms during the harvest was small. This was particularly true in Oklahoma and Kansas. Five hundred and forty-four farms in the Dakotas had approximately four times as many month hands working in the harvests in proportion to acreage harvested as were found on 468 farms in the southern States. But even in the Dakotas the month hands constituted less than a fourth of the harvest labor force. If the eastern section of Kansas and a large number of counties in Oklahoma had been included in the survey, the differences between these States and North Dakota in

this respect might have been diminished. Nevertheless the essential fact shown by the table would not be altered; the big wheat-growing section of Kansas is almost without month hands at harvest time; the big wheat section of North and South Dakota finds almost one-fourth of its harvest labor force by employing month hands.

Many farmers in Nebraska, South Dakota, and the Red River Valley sections of Minnesota stated that the number of month hands employed in their counties was not as large as before the war. They said that they had learned during the war how to get along without month hands. They now trade work more freely, in some cases work longer hours themselves, and arrange their crop acreage so they will have less concentration of work in the rush season and a more even spread of work in the summer.[4]

The scarcity of crop-season hands in Kansas seems to be due to the fact that 85 per cent of the cultivated acreage was planted to winter wheat and oats (Table 1) and the consequent work to be done during the spring months. In North Dakota the farmer does much of his soil preparation in the spring just before planting, and, with 30 to 50 per cent of his acreage in crops other than wheat, frequently finds work enough for his spring month hand to hold him over until haying begins, soon to be followed by the rye and early oats harvests.

On the average, for each field hand resident on the wheat farms when the harvest begins, whether a member of the farmer's family or a man hired by the year or month, approximately one extra hand had to be hired. In Kansas and Oklahoma the number of harvest hands considerably exceeded the number of men residents on the farms (1,085 as compared with 837) and constituted 56.4 per cent of the total harvest force. In the Dakotas and Minnesota, on the contrary, the harvest hands constituted less than 40 per cent of the total harvest labor force; and in Nebraska, where the farms visited were characterized by a wider variety of crops, only 21 per cent.

TABLE 2.—*Number, size, and percentage of farms of certain sizes which hired no harvest labor in 1921.*

State.	Farms reporting.					Number and size of farms which hired no labor.						
	Total number.	Average size (acres).	No labor hired.									
			Number.	Average size (acres).	Percentage of total number.	160 acres or less.	161 to 240 acres.	241 to 320 acres.	321 to 400 acres.	401 to 480 acres.	481 to 640 acres.	Over 640 acres.
Oklahoma	80	368.6	4	260.0	5.0	2	.....	1	.....	1	.....	.....
Kansas	387	536.7	42	301.5	10.9	12	6	14	4	2	2	2
Nebraska	206	271.3	90	208.0	43.7	46	22	15	2	1	3	1
South Dakota	195	408.3	82	365.0	42.1	16	12	23	9	10	5	7
North Dakota	349	540.0	102	320.0	29.2	14	10	38	6	9	19	6
Minnesota	72	442.1	26	313.0	36.1	4	6	9	3	2	1	1
Total	1,289	459.9	346	298.0	26.8	94	56	100	24	25	30	17

Three hundred and forty-six farms, 26.8 per cent of all farms visited, hired no labor at all for the 1921 harvest. Over half of these farms exceeded 240 acres in size; 47 exceeded 480 acres. Some

[4] For a discussion of this policy in Wisconsin see Farm Labor in Wisconsin by H. C. Taylor and J. D. Black, Wisconsin Agricultural Experiment Station Bulletin 316.

were farms of over 1,000 acres. (Table 2.) Therefore, the 2,921 harvest hands considered in Table 1 were all employed on 945 of the farms visited.

Comparison of the number of farms of each size that hired no labor (Table 2) with the total number of farms of each size (Table I of appendix) shows that the farms which hired no labor constituted the following percentages of the total number of farms of each size:

Forty-seven per cent plus (47.2) of all farms of 160 acres or less.
Thirty-nine per cent plus (39.2) of all farms of 161–240 acres.
Thirty-one per cent plus (31.5) of all farms of 241–320 acres.
Nineteen per cent (19) of all farms of 321–400 acres.
Sixteen per cent plus (16.2) of all farms of 401–480 acres.
Sixteen per cent plus (16.8) of all farms of 481–640 acres.
Nine per cent plus (9.9) of all farms of 641 acres and over.
Twenty-six per cent plus (26.8) of all farms of all sizes.

These figures indicate, as would be expected, that in the wheat belt the smaller farms are less dependent upon transient labor than the larger farms. It is one of the advantages of small-scale operation in wheat growing. But it also shows that a surprising number of large farms hired no labor in 1921. An analysis of the reasons which enabled them to dispense with hired labor throws considerable light on the factors controlling the demand for harvest labor.

Examination of Table 2 shows at once that in Kansas and Oklahoma nearly all of the farmers hired labor for the harvest. Those who did not were widely scattered.

On all of the four farms in Oklahoma which hired no labor in 1921 the grain was cut with a binder. Two of these were small farms. On each of the other two (a 320 and a 480 acre farm) there were 3 men (father and sons) in the family to do the harvesting. Three of the 42 Kansas farms which hired no labor had no harvest in 1921 because of crop failures, 24 cut their grain with binders, 2 used combines, and the other 13 cut all of their wheat with headers. The farms which used binders were mostly farms of less than 320 acres and were able to muster from two to four persons within the family who could work in the fields. Six of the farms which used headers had enough sons and daughters in the families to operate a header and one barge (grain wagon), and the others traded work with neighbors.

Two or three farmers made up a five-man or six-man header crew from the labor resident on their farms and cut the grain on their farms in succession. The wheat acreage on these farms was in each case less than 150 acres. A quarter section of wheat can be cut with a header in from six to eight days; consequently, the grain on all of the farms making up such a cooperative header crew could be cut in about three weeks.

The two Kansas farms where the grain was cut with combines, or harvester-threshers, without hiring any labor, were farms of 900 and 960 acres and harvested 500 and 700 acres of wheat, respectively. The combine heads the grain and threshes out the heads in one operation. The barges haul away threshed grain instead of heads. On the 900-acre farm a father and three sons worked in the harvest. Two ran the combine and two hauled away the grain. They harvested and threshed 30 acres a day. The other farm has a good-sized harvest crew within the family, seven sons, and operated both a combine and a header.

Pronounced differences in methods of managing the harvest work frequently obtained among farms in the same locality. An intelligent negro farmer in Ellis County, Kans., renter of 1,920 acres of land, with 800 acres of wheat in 1921, hired seven colored harvest hands. These, with himself and four sons, made two complete header crews of six men each, who harvested his grain at the rate of 60 acres a day. This gave his crew a two weeks' "run."

Another farmer in the same locality cooperated with two neighbors. Each of the three farmers hired one man. This gave them a header crew of six, and they then cut the grain on the three farms with the same crew. These farmers' labor costs were reduced. Each farmer, in effect, worked as a harvest hand on the other farms to pay for part of the work done on his farm instead of paying cash. The three harvesters who were employed, however, had a longer "run" on this crew than they would ordinarily have obtained hiring out in a crew cutting on a single farm. A third farmer in this area paid 75 cents an acre to a header operator for cutting his grain, and supplied the rest of the crew himself. Some owners in western Kansas who had small acreages hired their grain cut at approximately $2.50 an acre and hired no labor directly.

In the other States all the farms which hired no labor cut their wheat with binders. This method of harvesting, as is shown in more detail below, permits a more varied practice than does harvesting with headers. Grain can be cut with a binder before it is entirely ripened, while headers and combines can be used only on ripened grain. This gives the farmer cutting with a binder a longer harvesting season if he needs it. He can cut his grain more slowly, that is, with less labor in the fields. Some farmers cut their grain, allowed the bundles to lie until they had finished, and then went back and shocked them. (See fig. 1.) Some hired a man to shock behind one binder; others hired a shocker to two binders, the binder men helping the shockers as necessary. Others used two shockers to three binders. On some farms each binder was pulled by horses or a tractor; on others from two to six binders were drawn by a single larger tractor.

In Oklahoma, southern and south-central Kansas, western Nebraska and northern South Dakota the farmers frequently began cutting with binders before the grain was ripe enough to head and then changed to headers as the grain ripened. It is possible for the farmer to transform certain types of headers into binders at will, which facilitates this method of harvesting. A few farmers in Kansas and Oklahoma started with binders and finished with combines.

These various methods of managing the harvest work call for different numbers of hired laborers. A farmer using one method may hire as many days' work done as a farmer using another method. But the first farmer may use 2 men for 21 days and the second may use 3 men for 14 days. The second farmer creates a stronger demand upon the labor market during the harvest in his county. He likewise returns his men to the labor market more quickly, giving them a shorter run of work and forcing them to seek work elsewhere at an earlier date.

Methods which call for a number of men for a short run increase the demand for men at the peak of the harvest, but throw the men out of work so frequently that the harvester's earnings are seriously reduced and the best classes of harvest hands are discouraged from

coming to subsequent harvests. Conversely, methods which use fewer men and spread the harvest over a longer period make the harvest more profitable to harvest hands and tend to attract more ambitious men.

Tables 1 and 2 show that the percentage which harvest hands constitute of the total labor force varies considerably from State to State; that more than one-fourth of the wheat farms visited hired no harvest hands at all; and that individual farmers in the same area manage their harvest work in dissimilar ways. Table 1 also reveals

FIG. 1.—Shocking wheat in the field. Bringing the sheaves to the shock (Oklahoma).

a wide variation from county to county both in the total amounts of labor hired and in the percentages harvest hands constitute of the total labor force. These variations are of much significance to those responsible for mobilizing and distributing harvest hands.

The Kansas counties exhibit more uniformity than those of the other States. Sedgwick County may be disregarded since information was obtained from only one farm in that county. Thomas County, then, in which 37 farms were visited, is the only Kansas county to vary sharply from the figures for the remainder of the State. On the average, the other 13 Kansas counties used 1.57 men

per 100 acres of small grain harvested; Thomas County, but 0.77 man. Moreover, Redwillow and Hitchcock Counties, Nebr., which are contiguous to Thomas County, reported approximately the same amounts of labor per 100 acres harvested as was reported for Thomas. These three counties, in all of which the header was used by most farmers for harvesting (Table 1) reported total harvest labor forces only half as large as those in the other 11 "header counties."

The farms visited in Thomas County averaged larger in size than in 9 of the 11 counties mentioned. The farms in the 2 Nebraska counties averaged as large as 9 out of the 11 counties. (See Table I of appendix.) The percentage of farms using combines in the three counties was no larger than the percentage of farms throughout Kansas. (See Table III of appendix.) Obviously the difference in the amount of labor used can not be accounted for by farms of smaller size or by difference in types of machinery used. And it was not due to spreading the harvest over a longer period. On the average, the Redwillow farms were cut in 12.2 days, the Thomas County farms in 12.8 days, and the Hitchcock County farms in 15.4 days. The average duration of the harvest work on the farms visited in the other header counties ranged from 11.1 days in Comanche County to 16 days in Sheridan County.

Thomas County was the only one of the three counties in which the average number of acres harvested per day was especially high. The average accomplishment in the header counties of Kansas and Nebraska ranged from 14.4 acres to 27.5 acres per day in the different header counties, except Thomas County, which harvested 35 acres. Thomas was the only one of the three counties using small amounts of labor that exceeded an average of 21 acres harvested per day.

TABLE 3.—*Length of the 1921 harvest period by size of farms.*

Acres wheat per farm.	Number of farms.	Average number of days in harvest.			Percentage of farms on which—												
					Harvesting required—						Time from beginning to completion of harvest was—						
		Worked.	Lost.[1]	Total.	Less than 10 days.	10 to 14 days.	15 to 18 days.	19 to 21 days.	22 to 25 days.	26 to 30 days.	Less than 10 days.	10 to 14 days.	15 to 18 days.	19 to 21 days.	22 to 25 days.	26 to 30 days.	Over 30 days.
160 or less	104	8.1	2.0	10.1	67.3	28.9	3.8	....	....	....	53.8	26.9	7.7	8.7	2.9	....	....
161 to 240	96	9.0	1.6	10.6	55.2	36.5	5.2	2.1	....	1.0	43.8	38.5	10.4	7.3	....	....	....
241 to 320	238	11.3	2.3	13.6	34.5	45.8	12.6	6.7	....	0.4	26.1	34.5	14.7	14.7	8.0	1.2	0.8
321 to 480	227	13.3	2.5	15.8	20.7	51.6	14.1	11.0	2.6	....	12.3	40.5	23.4	16.3	4.4	3.1	....
481 to 640	139	13.6	2.8	16.4	10.1	45.3	23.0	17.3	4.3	....	5.0	36.0	21.6	27.3	7.2	2.9	....
641 to 880	71	15.6	2.3	17.9	4.2	40.9	28.2	23.9	2.8	....	1.4	28.2	22.5	32.4	14.1	....	1.4
881 to 1,000	26	14.2	2.4	16.6	3.8	57.7	30.8	....	7.7	....	....	26.9	53.9	7.7	11.5	....	....
1,001 to 1,500	33	13.8	2.6	16.4	60.6	21.2	6.1	12.1	....	....	....	24.3	30.3	30.3	12.1	3.0	....
1,501 to 2,000	12	15.8	4.0	19.5	....	25.0	50.0	16.7	....	8.3	....	8.3	16.7	50.0	16.7	....	8.3
2,001 and over	9	15.7	1.3	17.0	55.6	11.1	22.2	....	11.1	....	....	33.3	33.4	22.2	....	11.1	....
Total	955	....	....	....	30.9	42.8	14.8	9.4	1.8	0.3	20.5	34.3	19.0	17.7	6.4	1.7	0.4

[1] Days of labor lost because of weather conditons, machine breakdowns, and other causes.

Thomas County accomplished its harvest with a realtively small labor force by working longer hours and increasing the average cut per day. Absence of rain and a very limited fall of dew during the nights enabled the farmers to get into their fields early in the morning

and late in the evening. A perennial lack of adequate harvest labor supply in this area has trained the farmers to push their harvest as rapidly as possible. The distance to Thomas County from the centers of labor supply and the fact that harvest hands, when they have finished there, must either go back to the eastern borders of Kansas and Nebraska in order to go into the Dakotas, or go to the West through Colorado, has for years discouraged harvest hands from going into the extreme northwestern corner of Kansas. It is a long trip, expensive both in time and money, and once there it is not possible for the harvest hands to go directly north into South Dakota. They must detour through Colorado or back to Omaha or Sioux City to go north and the detour must be made through several hundred miles of territory in which work can not be obtained. And while these harvest hands have been working in the Thomas County area, other harvest hands who did not go into northwestern Kansas to help complete the last portion of the winter wheat harvest, go north into the Dakotas. When the harvester who has "made the Colby country" finally reaches the spring wheat area he finds it very difficult to obtain employment. Thousands of harvesters have preceded him. Thomas County and the neighboring Nebraska counties have, therefore, had to adapt their harvest policies to chronic labor shortage. Because of the distance from Colby, this shortage is even more acute in the Nebraska counties than in Thomas County. Consequently, as Table 1 shows, Redwillow and Hitchcock Counties, in which the wheat acreage per farm is hardly more than half of that of Thomas County, have met the situation by doing without harvest hands. They have diversified their crops, cut down their small grain acreage, and relied upon family labor and cooperation between neighbors to accomplish the harvest.

The variations in amounts of labor used in the different counties in the remainder of Nebraska, the Dakotas, and Minnesota are largely to be explained in terms of variations in the amount of small grain acreage per farm and of variations in the amount of crop diversification. All of the area under discussion is harvested with binders. A few headers are used in northern South Dakota (see Table III of the appendix), but not enough to affect the total demand for labor.

In eight counties in Nebraska and two in South Dakota the average number of acres of small grain per farm ranged from 44 to 97 acres. In these counties the amount of labor on the farms at harvest time was very large in proportion to the small grain acreage—from 2.45 to 4.72 men per 100 acres of small grain. The reason, of course, was that more than half of the labor was employed at other farm work. The other 30 counties which cut with binders raised a large acreage of small grain, ranging from an average of 125 acres per farm to 468 acres. The average duration of the harvest in these counties ranged from 7.3 days to 14.7 days. In 28 of these counties the average harvest period was from 10 to 14 days. The number of acres cut per day increased steadily with the increase in small grain acreage while there was no corresponding increase in the duration of the harvest. Farms with less than 200 acres of grain harvested from 12 to 19 acres per day; those with between 200 and 300 acres harvested from 17 to 29 acres; farms with over 300 acres averaged a harvest of from 23 to 35 acres per day. More men and machines were put into the fields instead of extending the harvest over a longer period.

The reasons for this policy are of much importance in connection with the matter of estimating the amounts of harvest labor that will be needed in any area during a harvest season. Of course the figures do not signify that none of the farms took more than 14 days for the completion of their harvests. Table 3 shows that 26.3 per cent of all the farms visited harvested more than 14 days, and that 11.5 per cent harvested from 19 to 30 days. But very few farms of less than 480 acres harvested more than 18 days, and a still smaller number of even the largest farms harvested more than 21 days. It is substantially true to say that the wheat farmers take no longer to harvest farms of 2,000 or 4,000 acres than farms of 800 acres.

On farms of smaller size the duration of the harvest increases with the size of the farm. Farms of 160 acres or less are ordinarily

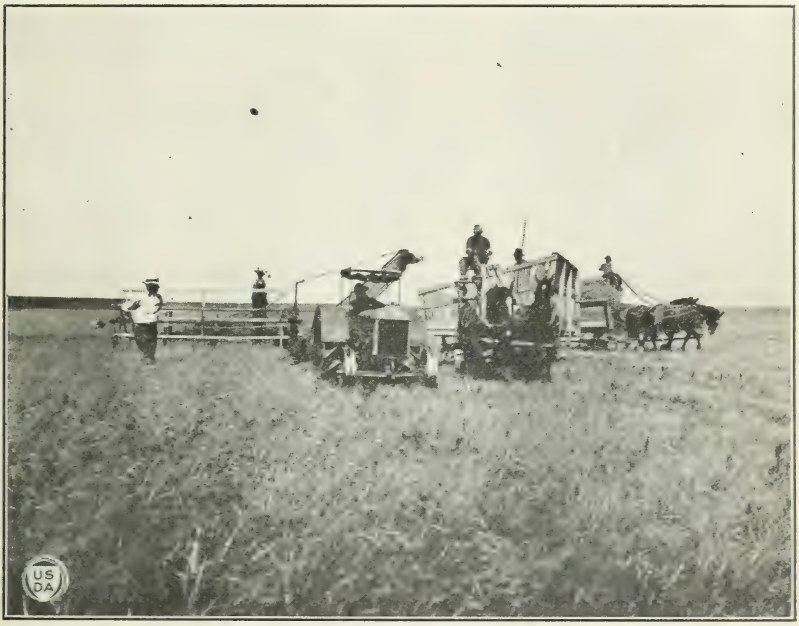

FIG. 2.—A header outfit in Pawnee County, Kans. This header outfit consists of a tractor, a header for cutting the grain, and the header barges, to haul the harvested heads to the stack. The elevator is carrying the heads into the barge at its right. In the rear, a team and loaded barge are pulling off to the right. This header crew consists of tractor operator, header operator, two teamsters and the barge man, and a stacker. This outfit cut and stacked 30 acres of wheat per day.

finished in 8 or 9 days; of 240 acres in 9 or 10 days; of 320 acres in 11 or 12 days; of 480 acres in 13 or 14 days; of 640 acres in 13 to 15 days; and of 880 acres in 15 to 18 days.

This increase in the duration of the harvest with the size of the farm in the case of the smaller farms is largely due to the fact that the amount of mechanical equipment (number of binders or headers) on the farms does not increase commensurately with the increase in acreage. A farmer on 240 acres can use the same equipment and same number of laborers as a 160-acre farmer and simply take a little longer time to cut his larger crop. A farmer with 400 acres of wheat may cut his crop with no more equipment than used by a man with 200 acres of wheat. Nature does not force the smaller

farmer to complete his harvest in 6 or 8 days. He hasn't enough grain to keep him busy longer, and the man on the somewhat larger farm can harvest twice as long instead of twice as fast, if he so desires.

The 640-acre farmer, on the other hand, if he is cutting his crop with an equipment that requires him to harvest from 14 to 21 days in order to get in his crop, is taking about all the time that nature allows him for the purpose.[5] Those who have more grain than the 640-acre farmer must put enough machinery and men into the field to get their work done about as quickly as he does his, or else their grain will begin to shatter and part of the crop be lost. Nature normally allows a maximum of three or four weeks' time for the harvest, although prolonged hot weather may materially reduce that maximum period. The largest farms must be able to finish in that time. Good management requires the farmer to plan to do his work in considerably less time than the extreme limit set by nature. Otherwise unexpected delays, or weather that forces the ripening of the grain, may cause him to lose part of his crop.

The significance of these facts interpreted in their effect upon the labor demand is threefold: (1) The big demand for harvest labor in a county is necessarily concentrated into a period of two to four weeks, generally two to three weeks; (2) the demand for labor varies directly with the size of the farms; (3) if a majority of the farms in a county are large farms the intensity of the demand in that county will be greater, especially when dry weather forces the crop and compels all of the farms to harvest at about the same time.

Labor emergencies, in other words, are much less severe where farms are relatively small and the amount of labor resident in the locality is therefore larger. The individual farm can handle a much larger proportion of its crop with the members of the family. The farmers of the neighborhood can cooperate and save each others' crops. The labor of three or four farms, and the machinery and horses, can frequently bind and shock within one to five days the fields which ripen first, and get all of the farms out of the way before the grain begins to shatter. Three or four farms can be "cleaned up" in this way within the period nature permits to the harvest.

Large farms, because the resident labor supply is entirely inadequate to handle the several farms successively, can not rely on neighborhood cooperation and must depend upon using more machinery and more hired labor. The same wheat acreage, therefore, may be handled with little or no hired labor when the farms average 240 to 320 acres in size, and may require a considerable number of harvest hands if grown on farms of 640 or 880 acres or larger.

EFFECT OF DIFFERENT KINDS OF MACHINERY UPON LABOR DEMAND.

Table III of the appendix shows the effects of the kind of machinery used in the harvest upon the amounts of labor used. Two striking facts stand out in the table: (1) That the total amount of labor used

[5] Experiments conducted by the Kansas Agricultural Experiment Station to determine the advantageous period for cutting showed that within a two week's period the maximum number of bushels was obtained on the eleventh and twelfth days of cutting and that subsequent to that date the yield began to decline. See "Wheat in Kansas." Report, September, 1920, Kansas State Board of Agriculture, Topeka, Kans., pp. 169–170.

per 100 acres cut does not seem to differ materially in areas where the binder predominates from the amounts used where the header is commonly used, and (2) that there seems to be a striking variation in the amounts of labor used in different areas using the same machinery.

The relative effects of the header and the binder upon the demand for harvest hands is not fully apparent, however, until the data in Tables I and II of the appendix are correlated, and this can best be done by comparing the facts for North Dakota, an area in which the binder is used exclusively, with Kansas, where the header predominates. Table I of the appendix shows that the average sizes of the farms visited in the two States were approximately the same. Table II of the appendix indicates that 85 per cent of the cultivated acreage of the Kansas farms was in small grain and 78 per cent of the North Dakota acreage. In reality the North Dakota percentage was larger since a considerable barley acreage in North Dakota is not included in the small grain figures given in Table II of the ap-

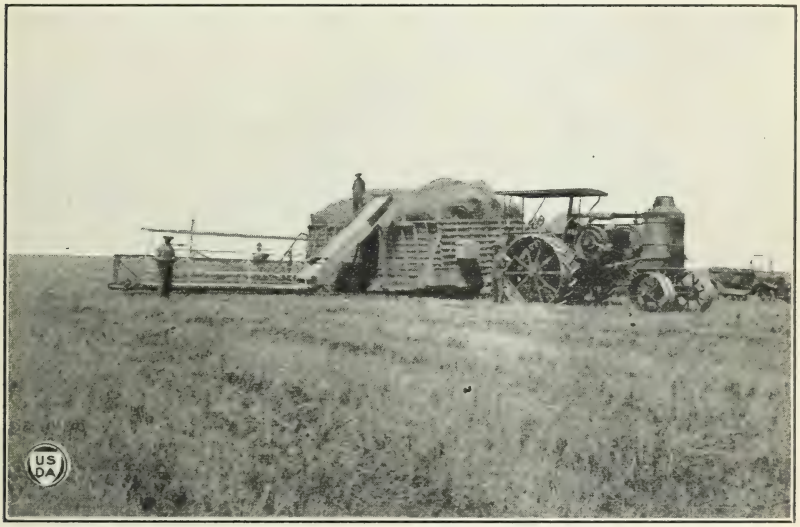

FIG. 3.—Header with stacker-barge, western Kansas. This barge is so constructed that when loaded it can be opened and drawn from under its load, leaving a stack of grain

pendix. Table I shows that in Kansas the amount of family labor working in the harvest was 4.6 per cent larger and the number of day hands (harvest hands) was 14.1 per cent larger than in North Dakota. In Dakota the percentage of month hands exceeded Kansas by 18.7 per cent, balancing the excess of family labor and day hands in Kansas. In other words, the percentage of hired labor working in the harvest was 4.6 per cent larger in North Dakota but the percentage of harvest hands employed was 14.1 per cent smaller. It appears, therefore, that while Kansas uses but slightly more labor per 100 acres of grain harvested, it hires a larger percentage of that labor during the harvest season and solely for harvest work. Consequently Kansas develops a more intense demand for harvest hands, in proportion to acreage harvested, than North Dakota does. Is the difference in machinery used the explanation for this more intense demand for harvest hands?

Obviously, two other factors and only two, need to be considered here: the differences in crops grown and the larger use of month hands in North Dakota. The Kansas farms studied had 81.7 per cent of their cultivated acreage in wheat; the North Dakota farms, 59 per cent. The wheat concentration was much higher in Kansas. Oats, rye, and barley raised the North Dakota small-grain acreage to a figure approximating that of Kansas. But these grains do not all ripen when wheat is ripening. Haying is followed in North Dakota by the rye and early oats and a good deal of harvest work is put out of the way before "the big harvest" begins. Consequently, the harvest period in a central or western Kansas county tends to be more concentrated than the harvest of a North Dakota county. Spring planting and the succession of harvests, with some corn and potato cultivation, enables many of the Dakota farmers to employ month hands, who, with the farmer and his family, handle the haying and the early harvest and materially reduce the demand for harvest hands during the wheat harvest season. The differences in crops and the larger use of month hands made possible by the crop diversification therefore account in part for the less intense demand for harvest hands in the Dakotas.

The different machinery used, however, has a very important effect upon the harvest labor demand in the two areas. The header requires for its efficient use a crew of six men; when the grain is heavy, often seven. A farmer can get along with a smaller crew but does not get maximum utilization of his header. When grain is headed the standard practice requires one man to drive the header, two men to drive the barges (or wagons) which receive the heads, two men in the barges to distribute the heads properly in the barge and pitch them to the stack, and a stacker to stack the heads. Sometimes, on large farms, the grain is hauled directly from the header to the threshing machine. In this case the stacker is dispensed with, and a crew of five men do the harvesting, while a separate crew runs the threshing machine and hauls away the threshed grain. When threshing from the header the farmer requires more rather than less men during his harvest. He uses less labor in the total than if he had harvested and threshed separately but he needs it all at one time.

A number of variations from the standard header practice have developed. Tractors powerful enough to pull both the header and a barge enable some farmers to employ the header efficiently with a five-man crew. When the barge is loaded, the tractor stops a few moments while a team hauls the loaded barge to one side and hauls an empty barge into position to be coupled to the tractor. Then, while the second barge is being loaded, the team hauls the loaded barge to the stack to be emptied. Most farmers, however, use one man on the tractor and one man on the header, and use a six-man crew even when using such tractors.

On some farms even larger tractors have been brought into service and important economies of labor cost achieved. In a typical case, a Kansas farmer used a large tractor to pull 2 headers and their barges, and employed therewith a crew of 8 men, instead of the crew of 12 ordinarily used when 2 headers and 4 barges are in service.

The "stacker" barge is another device made possible by mechanical field power. A number of different styles have been invented in

Kansas and tried out on various farms during the last few years. Two styles are illustrated (figs. 3 and 9). The stacker wagon seems to be a strictly Kansas device. It was introduced about 1915 by Winifred Jacobs, of Dodge City, and has been used more or less since that time in western Kansas. It is so constructed that it builds a stack under the header elevator as the header moves down the field, and eliminates the use of two barges. The wagon is usually built 20 feet long, 9 feet wide, and 11 feet high. "After the wagon is filled and ready to unload the stack a rear gate is opened and four skids drop from the wagon to the ground. A stake is driven into the ground where the stack is to set and a rope which runs over and under the load lengthwise, is fastened to the stake and the wagon pulled from under the load, leaving it as a stack on the ground."[6]

FIG. 4.—Stacking heads of wheat in Kansas. Men on the barge are pitching the heads from barge to stack; the stacker is building them into the stack. A skilled stacker is paid 50 cents to $1 a day more than a teamster or shocker.

ACRES CUT PER DAY BY VARIOUS MACHINES.

The number of acres cut per day by headers varies considerably. If a header operates with but one barge its daily cut averages but 15 to 20 acres; if it operates with two barges its cut will run from 20 to 30 acres. On about one farm out of six it will exceed 30 acres per day. For instance, on a 640-acre farm in Thomas County, Kans., with 360 acres of wheat, the cut was completed in 8½ days of 10½ hours each, or at an average rate of 42.3 acres per day and 4 acres per hour, with one header. This crew was composed entirely of transient labor. Another farm near Colby with 560 acres of wheat completed its cut in 14 days of 10 hours per day at the rate of 40 acres a day and 4

[6] "Wheat in Kansas," Kansas State Board of Agriculture, Topeka, Kans., p. 281.

acres an hour. These were the best cuts encountered, and only about one header out of five was found accomplishing 30 acres a day. On the average, the headers on the farms visited were averaging about 25 acres a day when using two barges.

The combines observed in operation were cutting from 20 to 30 acres a day. A Kansas investigation found an average of 26.3 acres and that "the acreage cut per day was rather uniform, with the exception of a slightly larger acreage cut in the western counties, where the machine could be started earlier in the morning. The amount of straw and yield of wheat did not seem to influence very greatly the number of acres which could be cut in one day."[7]

A machine on a farm visited in Oklahoma harvested and threshed 250 acres of wheat in 10 days; one in Pawnee County, Kans., 30 acres a day, and another accomplished 20 acres. A combine in Sheridan County, Kans., was handling 20 to 25 acres a day.

These combines had crews of three to five men, depending in part upon the distance the grain was hauled and the type of combine. For instance, the crew of a combine in Sheridan County consisted of a tractor driver, combine driver, and combine oiler, (all of them members of the farmer's family), and two grain wagon drivers, one of whom was a boy visiting at the farmer's home. Therefore but one man was hired for this crew. Another combine, a small one drawn by six horses, required a teamster, combine operator (farmer) and two grain haulers, one of whom was the farmer's son and the other a neighbor's boy.

The daily cut of binders varied more than the daily cut of headers. It was also smaller. The farms using binders averaged a cut of 15 acres per day; the headers 25 acres per day. Binders were found cutting from 9 to 18 acres per day, with the majority cutting from 10 to 16 acres. In rare cases the binder cut ranged as high as 18 to 22 acres or fell as low as 7 to 8 acres. This variation has many causes. Hilly land can not be cut as rapidly as level land. A wet soft field where the feet of the horses and the wheels of the binder sink into the mud may reduce the day's cutting to a low point. The binders themselves are of different sizes and cut swaths of varying widths. Sometimes two or more are hitched to a tractor. This may reduce the cut by each binder but may save enough labor and power cost to more than compensate for a more rapid cut by another method. When binders are pulled by horses, a strong, rapidly walking team, especially if four to six horses are used, will increase the cut materially.

More important, many farmers both in header and binder territory change horses at noon. With a fresh team of horses in the afternoon the day's cut is materially increased. Horses wear out more rapidly than men, and tired horses reduce the day's work of the crew. The cut of some machines is reduced by frequent breakdowns, while others, in better condition or in the hands of a better mechanic, have but few interruptions. Grain that is lodged can not be cut as rapidly as upstanding grain. The number of hours worked per day also directly affects the size of the cut.

The binder method of harvesting produces a more elastic demand for labor than the header or combine methods. The header calls

[7] Results of an investigation of the efficiency of the combine method of harvesting and threshing, by H. B. Walker, agricultural engineer, and E. L. Rhodes, farm management demonstrator, are published in "Wheat in Kansas," Report, Sept. 1920, Kansas State Board of Agriculture, Topeka, Kansas, pp. 273–281. Cf. also pp. 149–151 of the same report.

for six-man crews; the combine for three-man or four-man crews. The binder can be operated by one man, who can, if he wishes, cut a few acres and then stop cutting and go back and shock or even cut 100 acres or more and then shock it; or by two men, one cutting and one shocking; or by three men, two cutting and one shocking. All of these methods were used on farms visited. In large scale operations, such as those on a 4,000-acre farm in North Dakota, a cutting crew and a shocking crew may be employed. On this farm 18 binders were cutting, and a crew of 20 men, including the foreman, were setting up the bundles in shocks. A farmer who harvests with a binder, therefore, has more choice in the matter of hiring labor than the farmer using other methods.

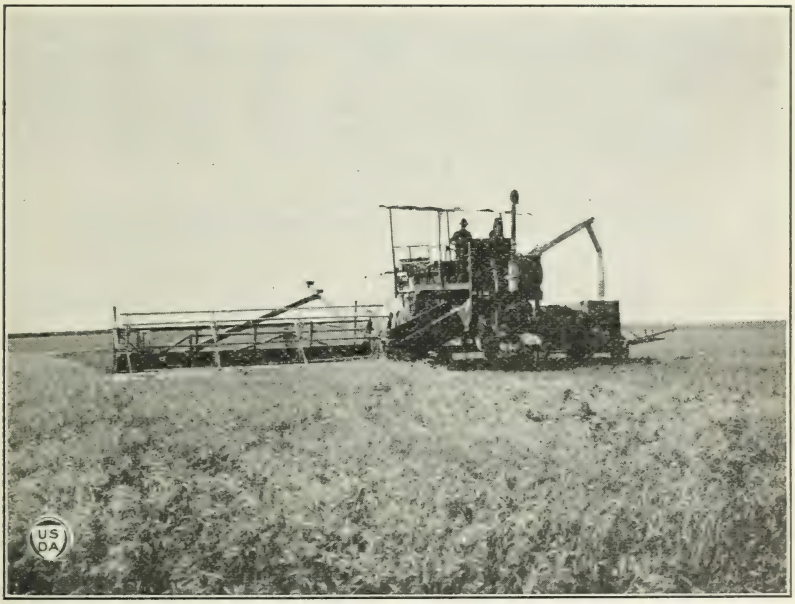

FIG. 5.—Front view of a combine. The grain chute extends to the right, with the grain running out into the grain barge. This combine furnished traction for itself and for the grain barge. When full, the barge is hauled away by a team and another empty barge is substituted. One teamster and a team are thus kept busy hauling. This method of harvesting and threshing reduces the use of man and horse power to a minimum.

The demand for labor where binders are employed is elastic within a harvest season. It is also more elastic from year to year than the demand where the use of headers predominates. When money is scarce, debts pressing, wages high, prices low, the crop poor, or other difficulties drive them to it, farmers in a binder country may do a much larger share of the harvest work than they would do if able to hire labor without serious inconvenience. Apparently such pressure existed in the case of seven Kansas farms which hired no labor in 1921. The same farms hired a total of 39 harvest hands in 1920. In 1921 these farms cut with binders and hired no labor; in 1920 they cut with headers and hired crews.

TOTAL CUT PER MAN.

Mention has just been made of the fact that the daily cut per machine varied widely on different farms and in different areas. It is likewise true that the total cut per man working varied considerably. It has already been noted that the Kansas formula for forecasting the labor requirements of the harvest assumes that each man working with a header will harvest on the average 50 acres of grain. The findings in the present study suggest that this is an underestimate. Fifteen counties which harvested less than 50 acres per man at work were all "binder counties"[8] while 14 counties which harvested from 50 to 59 acres per man included but three "header counties."[9] Seven binder counties and 4 header counties harvested 60 to 69 acres per man[10] and 10 binder and 2 header counties 70 to 79 acres per man.[11]

The farms visited in the remainder of the counties studied reported a very large cutting per man. Five counties, two of which used headers and combines freely and three of which used binders,[12] reported 80 to 89 acres per man; three binder counties reported 90 to 99 acres,[13] while three header counties and two binder counties reported cuttings of over 100 acres per man.[14]

TABLE 4.—*The labor turnover in 497 harvest crews. Ratio between number of men employed at peak of harvest and number of men hired during the harvest.*

Size of crew.	Number of crews of each size.	Number of farms on which total number of harvest hands hired constituted specified percentages of maximum number employed at any one time.					
		100 per cent.	101 to 150 per cent.	151 to 200 per cent.	201 to 250 per cent.	251 to 300 per cent.	301 to 400 per cent.
1 to 2 men	248	189	28	22	2	6	1
3 to 4 men	122	71	28	22	1	.....	.....
5 to 6 men	90	44	31	13	2	.....	.....
7 to 8 men	23	10	6	6	.....	1	.....
9 to 10 men	6	2	2	2	.....	.....	.....
11 to 12 men	4	.....	2	.....	2	.....	.....
13 and over	4	.....	2	.....	2	.....	.....
Total number of farms	497	316	99	65	9	7	1
Per cent of total number of farms	100.0	63.6	19.9	13.1	1.8	1.4	.2

Obviously this wide variation in the total acreage harvested per man is not due either to differences in machinery used or to differences in the efficiency of the harvest hands employed. It largely reflects the practices of the various areas with respect to the number of men employed in proportion to the acreage harvested. In areas like eastern Nebraska, where much labor is on the farms for other

[8] Oklahoma—Woods, and Alfalfa Counties. Nebraska—Clay, Hamilton, Seward, York, Lancaster, Saline, Saunders, and Dodge Counties. South Dakota—Union, Yankton, and Clark Counties. North Dakota—Barnes County. Minnesota—Big Stone County.

[9] Kansas—Sumner, Edwards, Ellis, and Graham Counties. Nebraska—Fillmore County. South Dakota—Marshall, Day, and Brown Counties. North Dakota—Ramsey, Cass, Walsh, Griggs, and Sargent Counties. Minnesota—Polk County.

[10] Kansas—Barber, Comanche, Ford, and Clark (all header counties). Nebraska—Adams County. South Dakota—Clay, Kingsbury, and Roberts Counties. North Dakota—Pembina and Foster Counties. Minnesota—Stevens County.

[11] Kansas—Pawnee, Sheridan, and Harper Counties. South Dakota—Spink, Brown, Marshall, and Day Counties. North Dakota—Dickey, Grand Forks, Traill, and Cavalier Counties. Minnesota—Marshall County.

[12] Kansas—Barton and Trego Counties. Nebraska—Furnas and Kearney Counties. North Dakota—Towner County.

[13] North Dakota—Stutsman and Pierce Counties. Minnesota—Kittson County.

[14] Nebraska—Redwillow, and Hitchcock Counties. Kansas—Thomas County. North Dakota—Eddy, and Benson Counties.

purposes than harvesting small grain, the accomplishment per man looks very small. In other areas, like Thomas County, Kans., where the amount of labor obtainable is very small the cut per man is very large. The figures indicate that it is impossible to generalize for the wheat belt, or for entire States, with respect to the number of men that will be hired to harvest a given number of acres of wheat, if the generalization is to be based upon an assumption that there is any general ratio between the number of men to be used and the acreage to be cut.

It is probably true, however, that the figures just given showing the average number of acres cut per man overestimate the average performance per man in some areas. If the labor turnover is high, that is, if the individual farmers in a certain area find it necessary to hire many new men to replace men quitting before their harvests are completed, the average cut per individual would be somewhat lower than the figures just cited indicate. On the other hand, the data furnished by the farmers interviewed did not show a high turnover on their farms.

Many farmers were unable to give accurate data on the turnover of labor on their farms, but figures were obtained from 497. (See Table 4.) Approximately 64 per cent of these farmers kept the same crew throughout their harvest, and in addition to these, 20 per cent kept more than half of their original crew through their harvest. Less than 3.5 per cent of the farmers had to hire twice as many men as they used at any one time in order to maintain their crews. Taking into consideration the fact that over 80 per cent of the harvesters hired were from outside localities, it is a good showing. It was very noticeable both in the 1920 and in the 1921 investigations that very few harvest hands or farm laborers complained of the wheat farmer as an employer. Even men who were severe critics of other kinds of employers generally said that the farmers "treated them square."

INFLUENCE OF CLIMATIC CONDITIONS UPON HARVEST LABOR DEMAND.

Climatic conditions are another factor that affects the amount of labor required to harvest the acreage of any county. Rainy weather during the growing season results in long straw, and this materially increases the labor necessary to handle the crop, especially in regions where the binder is generally employed. The number of bushels harvested when the straw is long is frequently no larger than when the straw is short, but both the difficulty and the cost of harvesting the crop are increased. Lack of moisture during the growing season, hot winds, lack of normal snowfall, seed blown out by heavy winds, and other climatic conditions often cause grain to be of such poor quality that it does not pay to harvest it at all. Fields are abandoned and areas that ordinarily require much labor for their grain harvest may hire practically none. This was true in portions of north-central South Dakota in 1921, as well as in parts of northwestern Kansas and restricted areas in the eastern half of North Dakota. Harvesters who had worked in these areas year after year came back in 1921 only to find themselves forced to look elsewhere for work. To some extent the variation in the amount of labor used in different counties (Table 1) was due to the above-mentioned climatic conditions.[15]

[15] For discussion of climatic factors in 1920, see "Harvest labor problems in the wheat belt," by D. D. Lescohier, U. S. Department of Agriculture Bulletin 1020.

Rainy weather during the harvest period has a varied influence. When the rains are localized, they delay the harvest where they occur, causing it to come on contemporaneously with areas normally harvested somewhat later. For instance in 1921, north-central Oklahoma suffered from heavy rains during the latter part of June, delaying the harvest in the area about Enid. The harvest in northwestern Oklahoma around Woodward, which ordinarily comes on 10 to 14 days later than the Enid area,[16] started on time. As a result, the plans of the officials in charge of harvest labor distribution in Oklahoma were seriously disrupted. They had estimated that Oklahoma would be able to handle its harvest without importing labor from other States since many oil fields and other industrial workers within the State were out of employment. They expected these men to handle the crop in the Enid area and then in the Woodward area, but the rains in the Enid area delayed the cutting there until not only the Woodward area but also south-central Kansas had started cutting.

On account of hot weather the Kansas harvest came early. "On one morning," said a State agricultural official of Kansas to the writer, "we figured that the harvest was two weeks away. The next morning we knew it would start within 24 hours." The number of men needed in northern Oklahoma in 1921 was increased by the delay caused by the rain. The grain was handled under difficulties. In Kansas the demand for the State as a whole was increased by the fact that unusually large areas were ready to cut at the same time. In South Dakota on the other hand, because of drought, the demand for labor and the duration of the harvest were both below normal. Some of the contrasts between counties in the amount of labor needed are explained by these variations in local climatic conditions during the growing and harvest seasons.

Rainy weather also causes grain ordinarily cut with headers or combines to be cut with binders. Frequent "dry harvests" cause farmers in binder areas, such as Spink and Brown Counties, S. Dak., to use headers, with which short and well ripened grain can be cut to better advantage than with binders. Many farmers in north central Oklahoma cut all or part of their crops with binders in 1921 who would have used headers and combines if the weather had permitted.

For instance, on one large farm, the cutting of a field of 1,500 acres had been started with a combine. Ten days of rain came on, and the combine was so badly mired that two tractors and four mules were required to draw it to high ground. It then resumed work on the hill tops, but two-thirds of the field had to be finished with binders, at greatly increased harvesting and threshing costs to the farmer. The change from one method of cutting to another necessarily affects the demand for labor, both as to volume and as to types of men sought, each kind of machine creating a different demand for men.

The weather conditions also affect materially the distribution of the labor supply. When rains delay the harvest of an area the harvesters go on to other localities. The farmers do not like to board the men in idleness on the farms, while the men get restless "lying around" on the farms and want to go to town. In town the

[16] See Department Bulletin 1020, pp. 6, 11.

expense of lodging and meals and the monotony of waiting for the cutting to be resumed cause them to migrate to areas where, as they learn from the newspapers, cutting is proceeding. When the rains are over, much of the labor which was in the locality has disappeared, and a severe shortage of labor is often experienced. Not infrequently the locality then feels that it has a grievance, that somebody should have found and had ready a new supply of labor to meet its needs when cutting is resumed. Meeting such emergencies is one of the duties of those in charge of the distribution of harvest hands.

USEFULNESS AND MODIFICATION OF THE KANSAS FORMULA FOR ESTIMATING HARVEST LABOR NEEDED.

Tables 1 to 3 and Table III of the appendix furnish figures which indicate that the Kansas formula tends to an overestimate of the demand for labor. On a total of 389 farms in the heart of the Kansas header wheat belt, 613 members of the farmers' families or 1.6 persons per farm were found working in the harvest. This correlates closely with the formula estimate of 1.5 persons per farm. But Table 1 indicates that the family labor plus month hands resident on the farms when the harvest begins constituted 1.8 men per farm instead of 1.5 and the formula should substitute 1.8 for 1.5.

The figures in Table III of the appendix, when stated in terms of the amount of wheat cut per man, do not coincide with the 50 acres per man figure given in the formula. Instead they indicate that in the header counties of Kansas and Nebraska the cut exceeded 50 acres per man in all cases and in all but four counties exceeded 60 acres per man. In the header counties of Kansas the cut of wheat per man was nearly 69 acres; one-third of all the header counties exceeded a cut of 70 acres per man. The figures suggest that a figure of "70" substituted for the "50" in the formula would give a more accurate measurement of the demand in the header counties of Kansas.

With some modifications the formula can be adapted to use in the binder areas as well. Table 1 and Table III of the Appendix show that the assumption that there are, on the average, 1.5 persons per farm family who work in the harvest can be used for all of the wheat States; but in the binder areas more month hands are employed. In South Dakota for each 1.5 family workers in the fields there was 0.8 man in the form of month hands. The labor resident on the farm when the harvest began was therefore 2.3 instead of 1.8, the Kansas figure for family labor plus month hands. In Minnesota it was 2.4 persons. If figures for eastern Kansas were available, the labor per farm would probably approximate more closely the figures for binder counties in other States than the figures for western Kansas. Therefore the first amendment to be made in the formula when applying it to binder country is to increase the figure for labor resident on the farm to approximately 2.3.

The average duration of the harvest in the binder counties is usually a little longer than in the header counties, but the difference does not appear to be large enough to require an alteration in the above formula. The figures in Table 3, which show the average duration of the harvest on farms of various sizes, will enable persons

who know the average acreage in a county to compute pretty accurately the duration of the demand for labor in their counties. Attention has been called to the fact that the average cut per man appears to be less in binder than in header counties. The typical cut in binder counties ranged from 40 to 60 acres per man, with the 50-acre figure of the formula more representative of binder counties than it appears to be of header counties. The formula can be used for binder counties, in the writer's opinion, if the figure 1.5 is changed to 2.3 without changing the "50-acre" figure for the cut per man.

One more fact brought out by the tables must be carefully considered in connection with the use of this formula. The counties with the same average cut per man seemed to be bunched in rather definite areas. The most accurate use of the formula would require, instead of using an absolute figure such as "50" or "70" in the formula for the "cut per man," that a figure true for the local area should be inserted in computing the demand for a given county.

In computing the total demand for the State in order to advertise for harvest labor the total demand should not be found by adding the individual county needs. Allowance must be made for the facts that individual harvesters work in two or more counties and that some portions of the State will be finished harvesting before others begin to harvest.[17] This reduction would ordinarily amount to 20 or 25 per cent of the gross total. On the other hand, the demand for threshing labor may begin before the demand for harvest labor subsides and intensify the demand for labor during the closing weeks of the harvest. Each year, for instance, the counties northwest of Grand Forks, N. Dak., are hiring harvest hands when southern North Dakota is calling for threshers.

LABOR DEMAND IN THRESHING.

Threshing is done after the harvest is completed on the individual farm. Grain cut with binders is ordinarily allowed to stand in the shock for a period of one to several weeks before being threshed. There are three important exceptions to this rule. Many of the larger farms, which hire a considerable number of men for harvesting, find it advantageous to hold their harvest crews for threshing and therefore start threshing as soon as they complete their harvest. The fields which they cut first are ready to thresh by the time they have completed the last of their harvesting. In Kansas many farmers who cut with headers haul the heads directly to the threshing machine instead of stacking them and threshing later, thus combining the harvest and threshing into one operation. This can be done because the grain is allowed to ripen before being cut. Whenever combines are used the threshing is, of course, performed with the harvest. There are from 1,500 to 2,000 farms in Oklahoma and Kansas where combines are employed.

Two hundred and fifty-seven, or 22.3 per cent, of 1,150 farms giving information on the point were threshed in 1921 by machines owned by the farmers themselves, either individually or cooperatively. The

[17] For instance, the writer talked with two harvest hands at the railroad depot in Larned, Pawnee County, Kans., at the end of the header harvest in that county, who said that they had worked in the binder harvest of eastern Kansas, then came to the header harvest of Pawnee County, and were then returning to work in the binder threshing of eastern Kansas. When this was completed they would return to western Kansas for the header threshing. They were Missouri farm boys and had made this double shift from eastern to western Kansas for five successive harvests

other 893 (77.7 per cent) were threshed by "contract threshers" who went from farm to farm threshing either by the bushel or at a flat price per day. (See Table 5.)

TABLE 5.—*Number and percentage of farms which threshed with farm-owned or contract machines.*

State.	Farm-owned machines.		Machines owned by threshers working on contracts.			Total number of farms.	Farmers' owned machines—		Machines owned by threshers working on contracts.		
	Individually.	Cooperatively.	Machine with 2 to 4 men. Farmer furnished crew.	Machine with full crew or nearly a full crew. Farmer boarded crew.	Machine with full crew or nearly a full crew. Crew brought cook car or shack.		Individually.	Cooperatively.	Machine with 2 to 4 men. Farmer furnished crew.	Machine with full crew or nearly a full crew. Farmer boarded crew.	Machine with full crew or nearly a full crew. Crew brought cook car or shack.
							Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Oklahoma	17	1	.....	60	2	80	21.2	1.3	.....	75.0	2.5
Kansas	32	7	.....	287	.....	326	9.8	2.2	.....	88.0	.....
Nebraska	32	21	123	22	.....	198	16.2	10.6	62.1	11.1	.....
South Dakota	27	8	58	62	26	181	14.9	4.4	32.0	34.3	14.4
North Dakota	82	15	50	109	59	315	26.0	4.8	15.9	34.6	18.7
Minnesota	15	.....	30	5	.....	50	30.0	.....	60.0	10.0	.....
Total	205	52	261	545	87	1,150	17.8	4.5	22.7	47.4	7.6
Total	257		893		.....	1,150	22.3		77.7		.....

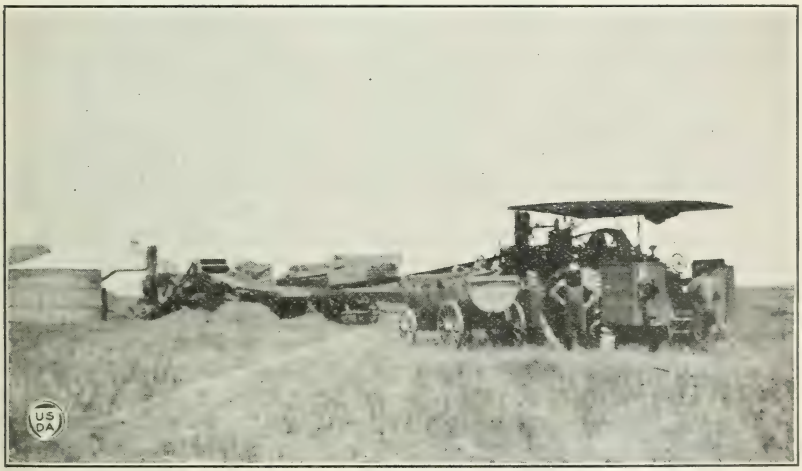

FIG. 6.—Threshing into a storage bin in the field. Metallic grain storage bins have been erected in the fields on many wheat farms in recent years. They constitute another labor-saving device. Ordinarily the wheat farmer has to have one or two men and teams to haul his grain from the threshing machine to town.

Considerable difference in practice was found in the different areas. In Oklahoma and Kansas the standard practice of the farmers was to hire a machine with a full crew. The farmer boarded the crew and paid a contract rate for the grain delivered to him at the separator. The farmer provided only the teams and men to haul away the grain.

Less than one-fourth of the Oklahoma farmers visited and but 12 per cent of the Kansas farmers were threshing with their own machines.

In central Nebraska the situation was entirely different. More machines were owned jointly by several neighboring farmers, who used them to thresh only their own farms, than was the case in any other part of the wheat belt. These Nebraska farmers have developed an interesting method of threshing. From three to six or seven of them buy a moderate size machine. One of the farmers acts as engineer, another as separator man, another as spike pitcher. The others with their hired men, sons, and daughters do the field or stack pitching and drive the teams. The farmer whose grain is being threshed boards the crew while on his farm, and the wives of the cooperating farmers help the wife with the extra housework involved. Thus dependence upon transient labor is eliminated.

The standard practice in the Nebraska counties when contract threshers are hired also differs from that in the Kansas counties. In Nebraska the farmer ordinarily hires a machine with a crew of but two or three men; that is, engineman, separator man, and perhaps a water man, and the remainder of the crew consists of neighbors trading work with the farmer whose grain is being threshed. The farmers of the neighborhood work from farm to farm, trading work, with a limited amount of money exchanging hands to balance accounts between individual farmers where one gives more work than he gets. In Nebraska only 11 per cent of the farms hired machines with full crews, and these were mostly in Redwillow and Hitchcock Counties, where the conditions are the same as in northwestern Kansas.

The same practice obtained in Minnesota as in Nebraska and the reader will note in Table 5 that in Nebraska and Minnesota almost a third of the farmers owned in whole or in part the machines which threshed their farms. Approximately 60 per cent hired machines with 2 to 4-man crews and furnished the remainder of the crews themselves, and only about 10 per cent of the farmers hired machines which brought a full crew with them. The similarity between the conditions observed in these two States is not accidental. In both States considerable progress has been made in the wheat growing counties toward crop diversification and the splitting up of the farms into smaller units and there is a larger population per square mile of rural territory than in most of the other portions of the wheat belt.

The figures suggest that as the crop diversification now proceeding in the Dakotas and parts of Kansas and Oklahoma continues to develop, a larger and larger percentage of the threshing will be done by small machines owned by farmers using them and manned by the farmers of the neighborhood. Both in 1920 and 1921 the field groups found a widespread impression in the Dakotas among the farmers and agricultural leaders, State and County, that the small machines were gradually changing the threshing situation in those States.

These impressions were confirmed by several findings in addition to the fact revealed in Table 5 that North Dakota already does a large part of its threshing with machines owned on the farms where they are used: (1) Large threshing outfits were standing idle in many towns, and on inquiry concerning the reason of their idleness

the reply was made, "It doesn't pay to run them any more. You can't get a large enough run to pay to operate." (2) Threshing hands who have worked in the Dakotas for many seasons are almost universally complaining, "It doesn't pay to come to the threshing any more. You can't get a long enough run. There are so many machines in the State now that each machine has only a short run. The farmers who own their own machines get their work done in a couple of weeks. We used to get runs of six and eight weeks."[18] (3) The fact is shown in Table 5 that in this spring-wheat territory nearly one-third of the farms were being threshed by machines owned by the farmer. Half of these machines, or 13.6 per cent, of all machines visited, threshed only the farms of the owner or owners of the machine. A large number of these farms were comparatively small, less than a section in size. (4) Practically one-fourth of all of the threshing machines visited were less than 32-inch machines.

In the whole spring-wheat area (Table 5) the farmer provides the crew more frequently than in Oklahoma and Kansas. In a large percentage of cases the crew provided by the farmer in the Dakotas and Minnesota consists principally of neighboring farmers trading work or hired by the day. For instance, in a day's trip southwest of Fargo, N. Dak., in which over 30 farms were visited, all but 2 were threshing with crews composed of local farmers. The opportunities of employment for transient harvest and threshing hands appear to be declining. Work trading makes the farmer independent of the transient labor supply, it decreases the cash outlay of the farmer in getting his crop in and threshed, and it puts the money paid out for threshing labor into the hands of the local farmers, thereby increasing the prosperity and financial strength of the local community. In Kansas, on the other hand, the transient threshing hand is still an important factor in the situation.

Another interesting fact revealed by the table is that the Dakotas were the only part of the wheat belt in which threshing outfits brought cook cars with them and boarded their own crews. In Oklahoma two farmers reported that they had contracted with a threshing outfit that would board its own men, but no reference to such outfits was made in Kansas or Nebraska. In the Dakotas, however, 85 farms reported that the threshers they had engaged would board their threshing crews themselves and that the farmers would simply pay an agreed price per bushel for the threshed grain and the thresher "take care of everything." Figures 7 and 8 show the bunk and cook cars of such a threshing outfit in Grand Forks County, N. Dak.

Data on the number of farms threshed per threshing outfit were obtained for 115 outfits, 98 of which did contract threshing. Ten of the outfits were owned by two or more farmers jointly. It was found that three-fourths of the 115 machines threshed from 1 to 8 farms each, 4 to 8 farms being the most common season's work. Only 22 reported doing more than 8 farms, and only 6, more than 12 farms.

Extremely small and extremely large machines were almost equally common. Most of the machines had 28 to 40 inch feed boards, the

[18] This quotation is an almost verbatim report of statements made by at least 500 harvest hands interviewed in 1920 and 1921.

FIG. 7.—Bunk car and cook car, North Dakota. This outfit provided beds and meals for a threshing crew of 20 men in Grand Forks County, N. Dak. The cook, shown standing in the door of his "dining room," was one of the high-priced cooks often found with such crews. His last engagement before joining the threshing crew had been with a United States Geological Survey party in the Rocky Mountains.

FIG. 8.—The cook in his domain. Interior of cook car. At the extreme end of the car the cook prepared the meals, providing cakes, pies, cookies, and home made bread. The long table had a bench for ten men on each side.

32, 34, 36, and 40 inch machines being most numerous. Steam engines burning either straw or coal and gasoline engines were both being used for power. All of the newer outfits used gasoline tractors.

A 40-inch machine in Kansas with a capacity of 1,500 bushels a day was using a total crew of 22 men, 14 of whom were furnished with the machine and 8 by the farmer. The thresher's crew consisted of 1 engineer, 1 separator man, 1 water jack, 1 cook, 8 field pitchers, and 2 spike pitchers. The engineer and separator men were paid $8 a day and the rest of the crew $5 each, a total wage bill of $76 a day. The farmer provided 8 bundle wagons and drivers at a cost of $40 a day, exclusive of the teams. The total labor cost of this outfit was therefore $116 a day.

A 40-inch machine in South Dakota with a daily capacity of 1,200 bushels used a crew of 19 men, at a daily cost of $86. The engineer and separator man were paid $10 apiece; the oiler and 15 pitchers $4 each; and the water boy $2. Another outfit employed a crew of 19 men at $90.25 per day, the 5 field pitchers being paid $4

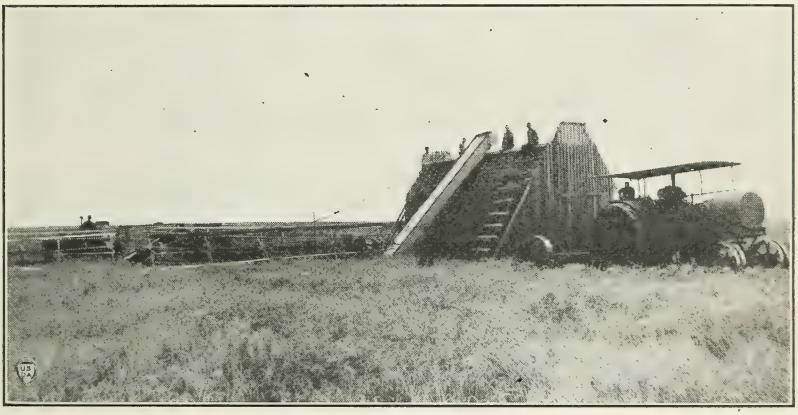

FIG. 9.—Forty-four feet at one cut. This stacker-barge works on somewhat the same principle as the one shown in Figure 3.

a day and the spike pitchers and bundle-wagon men (teamsters) $4.25.

A 42-inch machine, using a straw-burning steam tractor for power, employed 21 men—a separator man who also operated the tractor, a "straw-monkey," water jack, 2 spike pitchers, 8 field pitchers and 8 bundle-wagon drivers. The total cost was $96, the separator man receiving $9, straw monkey and spike pitchers $6, the water jack and bundle-wagon drivers $5, and field pitchers $3.

A 38-inch machine in Kansas using a gasoline tractor for power had a crew of 16 men and 2 women; an engineer, separator man, oiler, water jack, 2 spike pitchers, 10 bundle-wagon men, and 2 cooks (women). The typical crew for a machine of 38 to 42 inch feed board in an area where shock threshing is practiced is therefore from 18 to 22 persons, and the labor cost at 1921 prices ranged from $86 to $116 a day.

The crews of the smaller machines were not so large. A 32-inch machine in North Dakota, with a capacity of 1,200 bushels, used 12 men; an engineer, separator man, water jack, cook, and 8 bundle-wagon men. A 28-inch machine used 10 men. They had 2 field

pitchers and used only 6 bundle-wagon men. Two 20-inch machines each used 12 men having 1 spike pitcher and 8 bundle-wagon men. These machines had a capacity of 900 to 1,000 bushels. The labor cost of one was $51 a day, of the other $54, without including the work of the owner who acted as engineer.

MOBILIZATION AND DISTRIBUTION OF HARVEST HANDS.

The task of obtaining and distributing harvest hands for the wheat belt is now in the hands of the United States Employment Service, cooperating with the State employment services of Oklahoma, Kansas, Nebraska, Iowa, Missouri, and North Dakota, and with the farm bureaus and county agents.[19] Under the leadership of the United States Employment Service, a comprehensive organization for meeting the wheat farmer's harvest labor needs has been in course of development since 1919. Year by year this service has been attaining higher degree of efficiency. It has become one of the most important factors in the harvest labor situation. The suggestion made in a previous bulletin of this department on the harvest labor problems that "one of the most serious needs of the labor distribution organization in the wheat belt is the establishment of a large well-equipped office at Kansas City, Mo.," [20] has now been carried out and the service is now in better shape to meet the wheat farmers' needs than ever before.

Nevertheless, the majority of farmers still depend upon picking up men on the streets of neighboring towns rather than upon placing orders with their county agents or other local representatives of the employment service. Realizing this fact, and also realizing that many harvest hands will rely upon "picking up a job" by meeting farmers on the streets of country towns, the employment service disseminates information which advises harvesters of the progress of the harvest in the counties being cut at the particular date. Daily bulletins are posted in public places and furnished to the press which direct harvest hands to the areas where their services are needed. Tens of thousands of harvest hands whose names are never recorded in the employment offices are nevertheless directed to the farmer by the employment service in cooperation with the agricultural officials of the wheat States and counties.

In Table 6 the methods used by 1,091 farmers to obtain harvest hands are shown, and in Table 7 the number of men who were definitely directed to harvest jobs by the employment offices in 1921. Table 6 shows, as previously suggested, that the farmer has not yet come to rely to a large extent upon the employment agencies or the assistance of county agents or local business men to secure harvest hands for him. Probably a large percentage of the farmers never will. Nevertheless the service of these agencies is an important factor in the situation, for, to a considerable extent, they fill the needs of farmers who have been or will be unable to secure enough labor by picking it up on the streets. Areas like extreme southwestern and extreme northwestern Kansas, southwestern Nebraska, the sections of South Dakota east and west of Aberdeen, and of North Dakota west of a line north from Jamestown to Devils Lake, and north of a line running

[19] See Harvest Labor Problems in the Wheat Belt, U. S. Department of Agriculture Bulletin 1020, pp. 22-34. A detailed description of the employment service organization and its procedure will be found in "Kansas Hand Book of Harvest Labor," op. cit.

[20] Harvest Labor Problems in the Wheat Belt, op. cit. p. 28.

from Grand Forks to Devils Lake, can not obtain labor in adequate quantities unless some governmental agencies ship labor to them. The employment agencies, in other words, perform a service out of proportion to the number of actual placements they make by meeting the emergency needs of wheat areas badly located as regards labor supply, and by directing the harvest laborers who are "drifting" from town to town to the areas where they are needed.

TABLE 6.—*Methods of obtaining harvest labor used by 1,091 farmers in wheat harvest of 1921.*

State.	Total.	Number of farmers who used each specified method to obtain harvesters.								
		Hires neighbors and local townspeople.	Former employees return; advance contract made with them.	Pick up on streets of cities and towns in wheat belt.	Public employment offices.	County agents or farm bureaus.	Local bankers, business men, and commercial clubs.	Private fee-charging employment agencies.	Method satisfactory.	
									Yes.	No.
Oklahoma	84	7	3	56	7	1	8	2	27	17
Kansas	347	53	41	221	9	8	15	.....	210	54
Nebraska	167	56	4	80	4	14	8	1	101	15
South Dakota	161	31	10	94	15	6	4	1	127	13
North Dakota	274	33	30	144	39	14	6	8	192	38
Minnesota	58	11	4	34	4	4	1	.....	39	1
Total	1,091	191	92	629	78	47	42	12	696	138
Percentage	100.0	17.5	8.4	57.7	7.2	4.3	3.8	1.1	83.5	16.5

TABLE 7.—*Number of harvest hands directed to harvest work by Federal and State employment offices located in wheat belt. Figures are for 1921 harvest.*

[Data furnished by A. L. Barkman, U. S. Employment Service.]

Location of office.	Number of harvesters directed to work.
Texas:	
Fort Worth	6,073
Amarillo	1,592
Total	7,665
Arkansas:	
Little Rock	600
Oklahoma:	
Enid	2,600
Tulsa	1,344
Lawton	58
Guymon	800
Oklahoma City	2,066
Ardmore	332
Wichita Falls	420
Total	7,620
Missouri:	
St. Louis	1,123
Kansas City (depot)	3,480
Kansas City	3,794
Total	8,397
Kansas:	
Wichita	11,759
Parsons	756
Kansas City	764
Colby	650
Dodge City	591
Topeka	1,502
Salina	4,600
Hutchinson	9,950
Total	30,572
Nebraska:	
Omaha	132
Hastings	395
Lincoln	667
Total	1,194
Iowa:	
Sioux City	2,503
South Dakota:	
Sioux Falls	135
Mitchell	309
Aberdeen	815
Huron	463
Total	1,722
North Dakota:	
Fargo	3,553
Grand Forks	1,934
Jamestown	479
Devils Lake	1,319
Bismarck	196
Minot	1,771
Oakes	628
Total	9,880
Minnesota:	
Minneapolis	817
Grand total	70,970

It is interesting to note in Table 6 that nearly a fifth of the farmers interviewed (17.5 per cent) obtained enough labor from their own localities while 8.4 per cent made contracts each year with satisfactory men to return the following season. It is surprising that a larger number do not make such advance contracts.

WAGES AND HOURS OF HARVEST AND THRESHING HANDS.

The hours worked in harvest and threshing are shown in Table 8, and wage rates are summarized in Figures 10 to 12 and in Table IV of the appendix. On more than two-thirds of the farms visited the prevailing labor day in harvest was 10 hours, and on about one-third 10 hours in threshing. Omitting Nebraska, the 10-hour day obtained in the harvest on 74.4 per cent of all farms visited. In the Dakotas and Minnesota it was the rule on 79.3 per cent of the farms. In threshing, the 11-hour day was more common. In Oklahoma it was the rule and in Nebraska and Minnesota was found on nearly half of the farms. In Kansas and the Dakotas, however, the 10-hour day was practically as common as the 11-hour day, even in threshing, and in North Dakota more farms were found threshing 10 hours than 11 hours. It was pointed out in the previous bulletin on harvest-labor problems, and was also ascertained in the present study that nearly three-fourths of the transient harvest hands are industrial rather than agricultural workers. The distinct tendency toward a shorter working-day in the harvest is probably in large part due to this fact. The industrial laborer, accustomed to a 9 or 10 hour day during the remainder of the year, is strongly opposed to working 11 or 12 hours during the harvest.

TABLE 8.—*Hours worked per day by harvest and threshing crews, 1921.*

State.	Total number farms harvesting.	Per cent of harvest crews which worked each number of hours in 1921.						Total number farms threshing.	Per cent of threshing crews which worked each number of hours in 1921.				
		9 hours.	10 hours.	11 hours.	12 hours.	13 hours.	14 hours or over.		10 hours.	11 hours.	12 hours.	13 hours.	14 hours and over.
Oklahoma	66	7.6	62.1	27.3	3.0	.....	.....	13	7.7	69.2	23.1	.....	.....
Kansas	277	14.4	70.0	12.3	3.3	.....	.....	19	36.8	36.8	26.4	.....	.....
Nebraska	132	6.1	37.1	39.4	10.6	.7	6.1	104	23.1	45.2	16.3	3.9	11.5
South Dakota	134	.....	75.4	20.1	4.5	.....	.....	116	36.2	43.1	18.9	.9	.9
North Dakota	239	.....	80.3	13.0	6.3	.4	.....	123	46.4	37.4	14.6	.....	1.6
Minnesota	37	.....	86.5	10.8	2.7	.....	.....	33	21.2	48.5	30.3	.....	.....
Total	885	6.0	68.8	18.8	5.3	.2	.9	408	33.8	42.9	18.4	1.2	3.7

There are wide variations in the wages paid during harvest and threshing, from State to State, county to county, and farm to farm. About one-third of the Oklahoma farmers interviewed in Woods and Alfalfa Counties in 1921 paid $4 a day, about 7 per cent of them $4.50, and about 60 per cent $5 a day. The Oklahoma counties south and east of those visited, as shown in Figure 12, paid lower wages. Woods and Alfalfa Counties had to compete for labor with southern Kansas and had to meet the Kansas rates.

In south-central Kansas, from Sumner to Comanche Counties (as listed in Table 1) the $4 wage was three times as frequent as the $5 rate, but in the remainder of the Kansas counties a $5 wage obtained on 8 out of every 10 farms.

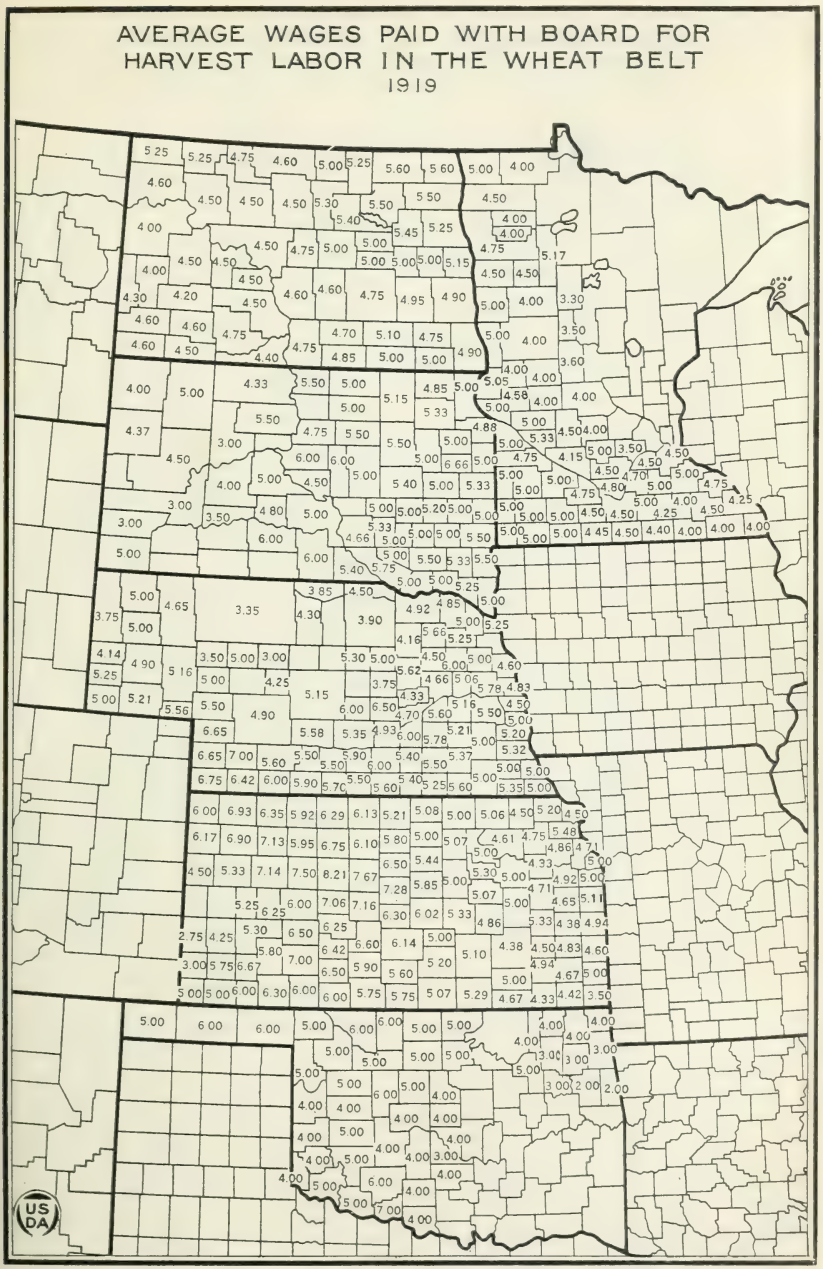

FIG. 10.—Wages for harvest labor vary in the different States and in the different counties, and even from farm to farm.

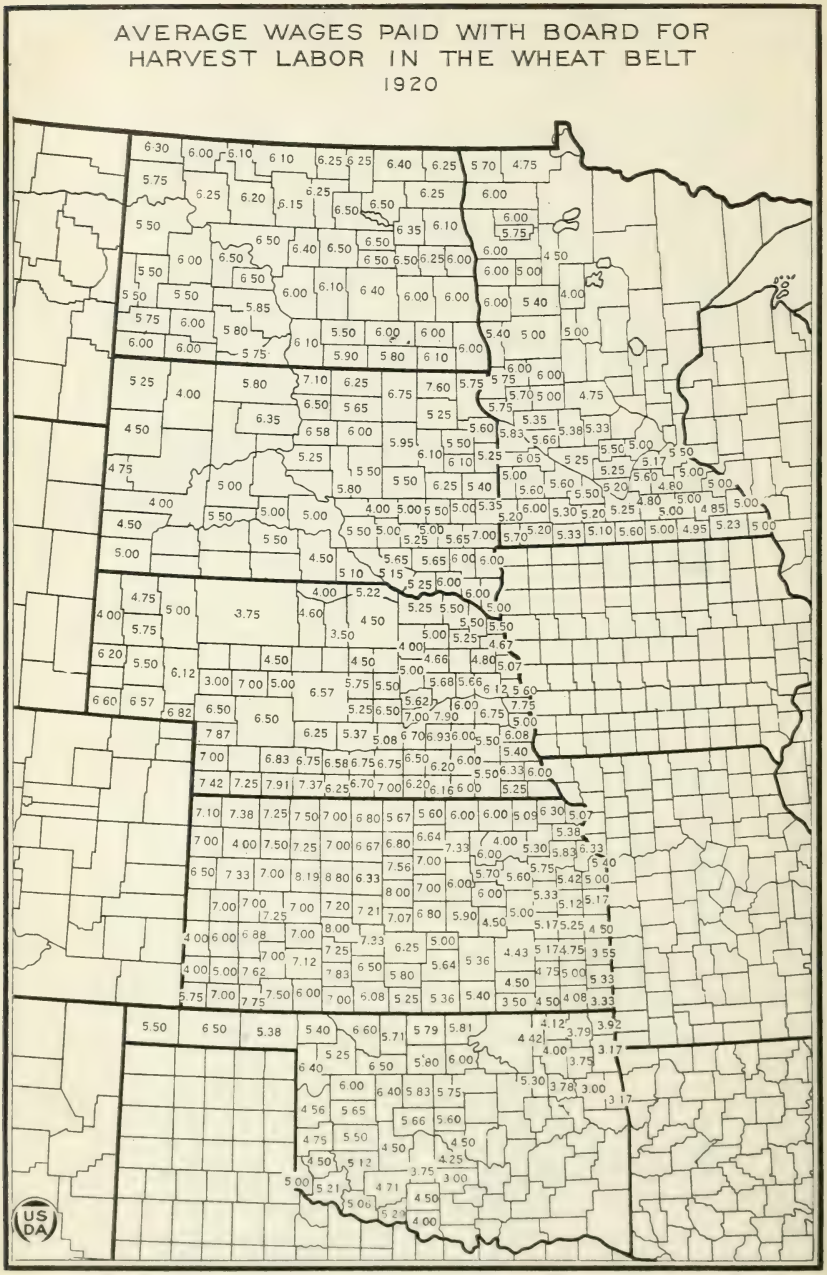

FIG. 11.—Wages for harvest labor vary in the same county from year to year

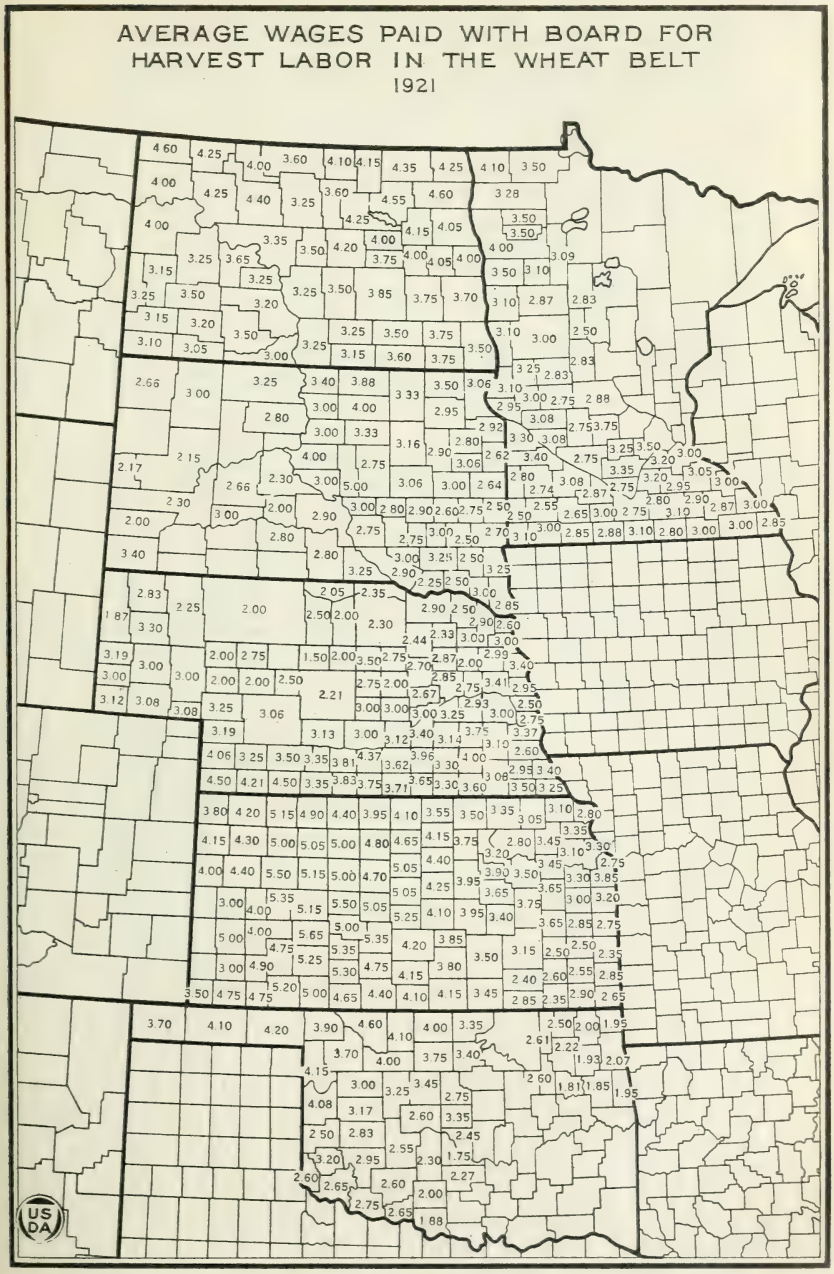

FIG. 12.—Harvest wage fluctuations are largely due to changes in the ratio between labor supply and demand, and to distances to the sources of labor supply.

Wages in Nebraska were both lower than those in Kansas and less standardized. In Redwillow and Hitchcock Counties, which are contiguous to northwestern Kansas, the $4 rate prevailed. In Thomas County, Kans., just across the State line, the farmers paid $5. A harvester who finished working in Thomas County and crossed over into a neighboring county in Nebraska had to accept a wage $1 a day lower. If he went eastward across southern Nebraska, or came up out of central Kansas, where the $5 rate prevailed, and sought harvest work in central or northeastern Nebraska, he found almost half of the farms paying $3 or $3.50, and the remainder $4. Some were paying only $2.50.

As he went on into South Dakota, the $4 wage almost disappeared. Over half of the farms visited in South Dakota paid $3 a day for harvest hands in 1921, nearly one-third paid $3.50. One in twelve paid $4 a day. In North Dakota the effort of the farmers to hold the wages to $3 or $3.50 per day continued. Of 228 farmers who furnished data, 41.2 per cent stated that they obtained their harvest hands in 1921 at $3 a day; 26.3 per cent at $3.50, and 28.9 per cent at $4 a day. Only 5 said that they paid $4.50 and only 3 that they paid $5. The wage distribution in Minnesota was almost identical with that in North Dakota, with the rate averaging a little lower in Minnesota.

The reasons for these wide variations in harvest wage rates have been discussed in detail in a previous publication.[21] Essentially, the wage fluctuation from State to State and from one section of a State to another is due to changes in the ratio of labor supply to demand on the one hand, and to distances from the sources of labor supply on the other.

The conditions which make the Kansas "header harvest" particularly dependent upon the transient harvest hand have already been described. The effect of this dependence upon the harvest wage is accentuated by the fact that the "big harvest" begins in Kansas. The task of attracting labor from other States to the harvest falls with particular weight upon Kansas. It is the Kansas opportunity and the Kansas wage which must be used to attract industrial labor from the cities, the oil fields, construction work, and the farms of Iowa, Arkansas, and Missouri. Consequently Kansas must offer wages high enough to lure labor to the harvest; and she must lure the labor or lose much of her crop. Naturally the portions of Kansas farthest from Kansas City must pay the highest wages to make it worth a harvester's while to go to them, and the wages in eastern Kansas are lower than those in western Kansas.

Once in Kansas, many of the harvest hands are certain to move on into Nebraska and the Dakotas. Meanwhile other laborers, coming out of Omaha, Des Moines, Sioux City, Chicago, Minneapolis, Duluth, Butte, and hundreds of other towns, go directly into the northern harvest. Two streams of labor supply are therefore attracted into the northern harvest, and the relation of demand to supply is altered. The binder harvest is not as dependent as the header harvest upon transient labor, and the supply is larger in proportion to the demand. The situation is generally "easier" from the farmers' point of view; more acute from the harvest hands' point of view in Nebraska and South Dakota than in North Dakota. Hence the annual cycle of

[21] Harvest Labor Problems in the Wheat Belt, op. cit., pages 5–12 and 30–35.

the wage rate follows a course very similar to that already described as obtaining in 1921. Starting at the bottom around Fort Worth, Tex., where many farmers paid but $1.50 and $2 a day for harvest hands in 1921, the rate rises to its maximum in central and northwestern Kansas, declines sharply in the Nebraska and South Dakota harvest, and then recovers somewhat in North Dakota, but seldom equals the Kansas maximum rates.

Wage data obtained from 1,050 harvest hands coincide closely with the figures given by the farmers. Of 123 who worked in Oklahoma, 64 received from $3 to $4, 45 received $4.50 or $5, and the other 13, who were particularly skilled, received higher rates. Of 415 who worked in Kansas, 134 were paid $4 and 201 received $5. Fifty-nine were paid more than $5. In Nebraska 77 per cent and in South Dakota 80 per cent of the laborers interviewed were paid from $3 to $4. In North Dakota and Minnesota approximately 45 per cent were paid $3 and $3.50, 33 per cent $4, and 12 per cent $4.50 and $5. The others were mostly skilled threshing hands, who were paid more than the $5 rate.

The wages paid in threshing average higher than those paid in the harvest. A larger portion of the work is skilled, and some of it is highly skilled work. Ten dollars a day is a more or less standard wage for engineers and separator men throughout the wheat belt, a minority receiving less or more than that figure. Field pitchers usually receive about the same wage that harvest hands have been paid in the same area, though frequently this wage is 50 cents per day higher than that of shockers. During recent years the practice of paying harvest and threshing hands by the hour rather than by the day has become more and more common, and, since the hours are commonly longer in threshing than in the harvest, this fact also affects the threshing wage.

Bundle wagon drivers are often paid 50 cents a day more than field pitchers, while spike pitchers get 50 cents to $1 more than the wagon men. In 1921 $4 was the prevailing wage for field pitchers in the Dakotas, $4 to $4.50 for bundle wagon drivers, and $4.50 to $5 for spike pitchers. Men cooking for threshing crews had no standard wage. The number of men so employed is small, and the wage is fixed in each case by individual bargaining. Rates of $5 to $7 per day obtained in 13 such cases.

Data are available upon the sleeping accommodations provided by 724 farmers for their harvest hands. Approximately two-thirds of them kept the men in the houses, 28.9 per cent slept their men in barns or granaries, and 6.3 per cent provided bunk houses or tents. Only 3 out of 724 farmers had failed to make definite arrangements for their men, and the harvest hands interviewed made little complaint on this score. Since mosquitoes are scarce in the wheat belt, and since comfortable accommodations can be provided in barns and granaries, these accommodations are often as desirable as those in the house. The principal complaint of the harvester was the lack of bathing facilities on the farms. The farmer who cleaned up one of the water troughs he used for watering horses or stock and pumped it full of clean water each morning, allowing the water to be warmed by the sun during the day and thus made available a miniature swimming pool, was long and gratefully remembered by his harvest crew. Many farmers allowed the men to use their bathrooms. On some farms streams were available.

APPENDIX.

TABLE I.—*Average and classified sizes of farms from which information upon whe a harvest labor was obtained, by States and counties.*

State and county.	Number of farms.	Total acreage of farms.	Average acreage of farms.	Number of farms of each specified size (acres).										
				160 or less.	161 to 240.	241 to 320.	321 to 400.	401 to 480.	481 to 560.	561 to 640.	641 to 880.	881 to 1,000.	1,001 to 1,500.	1,501 to 2,000.	Over 2,000.
Oklahoma:															
Woods	54	21,010	389.1	9	4	19	3	6	....	9	4	....	....	....	....
Alfalfa	26	8,480	326.2	11	2	6	3	1	1	1	....	....	....	1	....
McKay	1	110,000	110,000.0	....	....	....	....	....	....	....	....	....	....	....	1
Total	81	139,490	[1] 368.6	20	6	25	6	7	1	10	4	....	....	1	1
Kansas:															
Sumner	45	12,631	280.7	14	6	15	8	....	....	....	1	1	....	....	....
Sedgwick	1	186	186.0	....	1	....	....	....	....	....	....	....	....	....	....
Harper	24	8,320	346.7	7	6	4	2	1	....	1	1	1	1	....	....
Barber	27	30,725	1,138.0	7	1	4	4	5	2	1	....	....	....	2	1
Comanche	23	10,665	463.7	2	1	10	1	3	....	4	....	1	....	1	....
Clark	15	18,788	1,252.5	....	1	4	....	1	....	2	2	2	1	....	2
Ford	41	19,360	472.2	1	3	12	3	9	....	7	4	1	1	....	....
Edwards	12	4,040	336.7	2	5	2	....	....	....	2	1	....	....	....	....
Pawnee	53	22,270	420.2	3	5	17	6	11	1	7	1	1	1	....	....
Barton	7	2,460	351.4	1	1	1	1	3	....	....	....	....	....	....	....
Ellis	37	20,025	541.2	3	4	8	6	5	....	7	1	....	1	1	1
Trego	18	7,800	433.3	1	....	8	2	2	....	3	2	....	....	....	....
Graham	26	11,925	458.7	2	5	9	2	1	1	1	2	2	....	1	....
Sheridan	21	12,360	588.6	1	....	4	6	2	1	3	2	1	....	....	1
Thomas	37	26,130	706.2	1	2	5	1	9	2	6	3	3	3	1	1
Total	387	207,685	536.7	45	41	103	42	52	7	44	20	13	8	6	6
Nebraska:															
Redwillow	28	12,005	428.8	3	1	8	4	3	2	2	4	1	....	....	....
Hitchcock	11	5,510	500.9	1	....	3	....	2	....	....	2	2	1	....	....
Furnas	10	3,235	323.5	....	2	4	1	1	1	1	....	....	....	....	....
Kearney	4	1,820	455.0	....	....	2	....	....	....	2	....	....	....	....	....
Adams	3	570	190.0	1	2	....	....	....	....	....	....	....	....	....	....
Clay	21	4,172	198.7	10	6	5	....	....	....	....	....	....	....	....	....
Hamilton	12	2,872	239.3	5	2	4	....	....	1	....	....	....	....	....	....
Fillmore	19	4,955	260.8	5	9	2	1	1	....	1	....	....	....	....	....
Seward	9	1,775	197.2	6	1	....	2	....	....	....	....	....	....	....	....
York	10	1,695	169.5	7	2	1	....	....	....	....	....	....	....	....	....
Lancaster	36	8,166	226.8	21	6	5	1	....	1	1	1	....	....	....	....
Saline	11	2,040	185.5	7	3	1	....	....	....	....	....	....	....	....	....
Saunders	13	2,240	172.3	8	2	2	....	1	....	....	....	....	....	....	....
Dodge	19	4,847	255.1	9	3	2	3	1	1	....	....	....	....	....	....
Total	206	55,902	271.4	83	39	39	12	9	6	7	7	3	1	....	....
South Dakota:															
Union	12	2,566	213.8	4	6	1	....	1	....	....	....	....	....	....	....
Clay	6	2,330	388.3	2	....	1	....	1	1	1	....	....	....	....	....
Yankton	4	1,020	255.0	2	1	....	1	....	....	....	....	....	....	....	....
Kingsbury	1	420	420.0	....	....	....	....	1	....	....	....	....	....	....	....
Clark	30	11,030	367.7	2	2	15	4	3	1	3	....	....	....	....	....
Spink	39	17,517	449.2	3	5	8	3	10	1	2	3	2	2	....	....
Brown	58	23,900	412.1	6	6	14	7	10	2	10	3	....	....	....	....
Marshall	14	8,025	573.2	1	1	1	3	1	2	1	3	....	....	1	....
Day	22	8,936	406.2	1	2	8	2	3	1	3	1	1	....	....	....
Roberts	9	3,880	431.1	2	2	1	....	1	1	2	....	....	....	....	....
Total	195	79,624	408.3	23	25	49	20	31	9	22	10	3	2	1	....
North Dakota:															
Dickey	28	13,580	485.0	1	4	3	7	5	1	1	2	1	3	....	....
Sargent	14	7,805	557.5	....	2	....	2	3	1	....	3	2	1	....	....
Cass	22	15,986	726.6	2	....	4	1	3	2	5	2	....	2	....	1
Traill	19	7,600	400.0	1	....	6	3	4	....	4	....	....	1	....	....
Grand Forks	26	12,580	483.8	5	....	6	1	5	....	3	3	2	1	....	....
Walsh	17	6,972	410.1	2	1	9	....	....	....	1	2	2	....	....	....

[1] McKay County not included in this average.

TABLE I.—*Average and classified sizes of farms from which information upon wheat harvest labor was obtained, by States and counties*—Continued.

State and county.	Number of farms.	Total acreage of farms.	Average acreage of farms.	Number of farms of each specified size (acres).										
				160 or less.	161 to 240.	241 to 320.	321 to 400.	401 to 480.	481 to 560.	561 to 640.	641 to 880.	881 to 1,000.	1,001 to 1,500.	1,501 to 2,000.	Over 2,000.
North Dakota—Contd.															
Pembina	21	9,530	453.8	3	5	3	1	3	1	....	2	2	1	....	....
Barnes	7	2,695	385.0	....	....	3	1	2	1	....	....	....	....	....	....
Stutsman	42	23,105	550.1	2	3	8	3	5	2	10	6	1	2	....	....
Foster	16	10,770	673.1	....	....	7	....	....	1	4	1	....	1	2	....
Eddy	11	7,140	649.1	1	....	1	2	3	....	1	1	1	....	....	1
Griggs	10	7,024	702.4	....	....	1	2	....	1	2	2	....	2	....	....
Benson	20	14,400	720.0	....	....	4	1	7	4	2	....	1	....	1	....
Ramsey	23	13,878	603.4	1	1	5	4	2	1	1	5	1	1	1	....
Towner	13	8,000	615.4	....	....	4	2	1	1	2	1	....	2	....	....
Cavalier	38	17,921	471.6	1	4	11	5	6	1	4	3	2	1	....	....
Pierce	22	9,280	421.8	1	3	6	3	4	1	2	1	1	....	....	....
Total	349	188,266	539.4	20	23	81	38	53	18	42	34	16	18	4	2
Minnesota:															
Big Stone	17	7,492	440.7	3	....	5	....	2	3	1	3	....	....	....	....
Stevens	4	1,445	361.2	....	1	2	....	....	....	1	....	....	....	....	....
Polk	29	13,231	456.2	2	6	9	3	....	2	2	4	....	....	1	....
Marshall	17	8,240	484.7	2	1	3	3	....	1	3	2	2	....	....	....
Roberts	1	160	160.0	1	....	....	....	....	....	....	....	....	....	....	....
Kittson	4	1,260	315.0	....	1	1	2	....	....	....	....	....	....	....	....
Total	72	31,828	442.1	8	9	20	8	2	6	7	9	2	....	1	....
Grand total	1,290	702,795	544.8	199	143	317	126	154	48	131	84	37	29	13	9
Per cent of 1,290 farms	.....	.....	.....	15.4	11.1	24.6	9.8	11.9	3.7	10.2	6.5	2.9	2.2	1.0	.7

TABLE II.—*Acreage of various crops on 1,290 farms in wheat belt, classified by States and counties.*

States and counties.	Total acreage—						Per cent wheat constituted of total cultivated acreage.
	Cultivated.	In wheat.	In oats and rye.	In corn.	In hay.	In barley, potatoes, flax, and miscellaneous crops.	
Oklahoma:							
Woods	14,974	13,401	380	488	240	465	89.5
Alfalfa	5,928	4,848	330	364	331	55	81.8
McKay	20,100	7,000	.....	5,000	8,000	100	34.8
Total	41,002	25,249	710	5,852	8,571	620	61.6
Kansas:							
Sumner	9,661	7,427	839	925	400	70	76.9
Sedgwick	149	120	15	.....	14	.....	80.5
Harper	4,943	4,025	480	230	128	80	81.4
Barber	8,855	6,097	505	1,485	553	215	68.9
Comanche	7,525	6,905	135	250	110	125	91.8
Clark	5,900	4,850	185	305	.....	560	82.2
Ford	14,810	12,575	415	405	410	1,005	84.9
Edwards	2,659	2,355	70	35	75	124	88.6
Pawnee	16,766	14,222	460	515	556	1,013	84.8
Barton	2,109	1,810	45	60	104	90	85.8
Ellis	10,913	8,719	170	240	280	1,504	79.9
Trego	5,706	5,065	100	211	40	290	88.8
Graham	7,529	4,785	205	1,850	60	629	63.6
Sheridan	8,917	6,660	315	1,325	65	552	74.7
Thomas	17,601	15,725	365	696	120	695	89.3
Total	124,043	101,340	4,304	8,532	2,915	6,952	81.7

TABLE II.—*Acreage of various crops on 1,290 farms in wheat belt, classified by States and counties*—Continued.

State and county.	Total acreage—						Per cent wheat constituted of total cultivated acreage.
	Cultivated.	In wheat.	In oats and rye.	In corn.	In hay.	In barley, potatoes, flax, and miscellaneous crops.	
Nebraska:							
Redwillow	8,855	7,035	155	1,120	145	400	79.4
Hitchcock	4,815	3,045	95	650	.....	1,025	63.2
Furnas	2,270	1,340	65	745	60	60	59.0
Kearney	1,205	645	70	310	40	140	53.5
Adams	530	315	100	105	.....	10	59.4
Clay	3,576	1,592	446	1,197	240	101	44.5
Hamilton	2,281	796	305	952	130	98	34.9
Fillmore	4,186	1,761	660	1,373	335	57	42.1
Seward	864	180	217	400	67	.....	20.8
York	1,353	615	170	538	30	.....	45.5
Lancaster	6,274	1,969	849	2,640	670	146	31.4
Saline	1,691	672	226	646	136	11	39.7
Saunders	1,807	646	237	675	249	.....	35.7
Dodge	3,522	1,061	741	1,323	287	110	30.1
Total	43,229	21,672	4,336	12,674	2,389	2,158	50.1
South Dakota:							
Union	1,600	870	125	580	20	5	54.4
Clay	1,994	320	429	1,145	90	10	16.0
Yankton	836	.....	221	490	115	10	.....
Kingsbury	327	35	100	75	47	70	10.7
Clark	7,319	1,266	1,572	1,647	787	2,047	17.3
Spink	14,447	9,473	1,169	2,390	580	835	65.6
Brown	20,308	11,718	2,623	3,068	1,385	1,514	57.7
Marshall	5,657	3,272	498	567	620	700	57.8
Day	6,019	3,260	813	931	410	605	54.2
Roberts	2,665	1,100	480	515	270	300	41.3
Total	61,172	31,314	8,030	11,408	4,324	6,096	51.2
North Dakota:							
Dickey	9,841	4,219	1,935	1,077	1,051	1,559	42.9
Sargent	5,845	2,220	1,025	1,000	880	720	38.0
Cass	11,838	8,060	1,463	1,298	368	649	68.1
Traill	5,583	3,365	659	880	378	301	60.3
Grand Forks	8,432	5,840	785	389	431	987	69.3
Walsh	4,128	2,220	812	169	160	767	53.8
Pembina	6,400	3,980	1,475	46	432	467	62.2
Barnes	2,123	1,345	325	75	185	193	63.4
Stutsman	17,950	10,125	3,133	1,263	1,734	1,695	56.4
Foster	7,528	5,010	945	253	715	605	66.6
Eddy	6,066	3,395	1,415	186	415	655	56.0
Griggs	5,652	3,405	1,275	205	532	235	60.2
Benson	9,431	6,405	1,715	8	865	438	67.9
Ramsey	9,790	6,245	1,265	75	645	1,560	63.8
Towner	6,013	3,915	1,185	40	373	500	65.1
Cavalier	13,009	7,136	3,799	10	1,073	991	54.9
Pierce	7,655	4,157	2,587	10	610	291	54.3
Total	137,284	81,042	25,798	6,984	10,847	12,613	59.0
Minnesota:							
Big Stone	4,789	1,826	895	1,038	520	510	38.1
Stevens	1,029	347	195	277	100	110	33.7
Polk	9,861	4,695	2,418	369	625	1,754	47.6
Marshall	7,084	3,940	1,785	124	465	770	55.6
Roberts	118	.....	35	40	3	40	.....
Kittson	930	570	190	25	35	110	61.3
Total	23,811	11,378	5,518	1,873	1,748	3,294	47.8
Grand total	430,541	271,995	48,696	47,323	30,794	31,733	63.2

TABLE III.—*Amount of labor used per 100 acres of grain harvested on farms using binders, headers, and combines, by States and counties.*

States and counties.	Number of farms.	Total acreage of small grain.	Percentage of farms which used specified harvesting machinery.				Total amount of man labor per 100 acres harvested of—	
			Binder.	Header.	Binder and header.	Combine.	Wheat.	Small grain.
Oklahoma:								
Woods	54	13,781	29.6	40.7	24.1	5.6	2.10	2.05
Alfalfa	26	5,178	73.1	11.5	7.7	7.7	2.27	2.12
Total	80	18,959	43.8	31.2	18.8	6.2	2.15	2.07
Kansas:								
Sumner	45	8,266	93.3	6.7			2.03	1.83
Sedgwick	1	135	100.0				.83	.74
Harper	24	4,505	87.5	8.3	4.2		1.57	1.40
Barber	27	6,602	25.9	44.4	22.2	7.5	1.77	1.63
Comanche	23	7,040		95.7		4.3	1.71	1.68
Clark	15	5,035		93.3		6.7	1.55	1.49
Ford	41	12,990	7.3	82.9	2.5	7.3	1.65	1.60
Edwards	12	2,425	16.7	83.3			2.00	1.94
Pawnee	53	14,682	1.9	75.5	7.5	15.1	1.46	1.42
Barton	9	1,855		77.8		22.2	1.27	1.24
Ellis	37	8,889	8.1	73.0	8.1	10.8	1.88	1.84
Trego	18	5,165		77.8	11.1	11.1	1.24	1.22
Graham	26	4,990	3.8	84.6	11.6		1.92	1.84
Sheridan	21	6,975	9.5	66.7	9.5	14.3	1.44	1.38
Thomas	37	16,090		91.9	2.7	5.4	.78	.76
Total	389	105,644	21.3	65.6	5.9	7.2	1.52	1.46
Nebraska:								
Redwillow	28	7,190	17.9	71.4	10.7		.92	.90
Hitchcock	11	3,140		63.6	27.3	9.1	.69	.67
Furnas	10	1,405	70.0	30.0			1.19	1.14
Kearney	4	715	100.0				1.24	1.12
Adams	3	415	100.0				2.22	1.69
Clay	21	2,038	100.0				3.20	2.50
Hamilton	12	1,101	100.0				4.27	3.09
Fillmore	19	2,421	100.0				2.50	1.82
Seward	9	397	100.0				10.57	4.79
York	10	785	100.0				3.74	2.93
Lancaster	36	2,818	100.0				4.92	3.44
Saline	11	898	100.0				3.29	2.45
Saunders	13	883	100.0				4.33	3.16
Dodge	19	1,802	100.0				5.00	2.94
Total	206	26,008	82.0	14.6	2.9	.5	2.25	1.88
South Dakota:								
Union	12	995	100.0				4.48	3.92
Clay	6	749	100.0				3.45	1.47
Yankton	4	221	100.0					5.89
Kingsbury	1	135	100.0				5.72	1.48
Clark	30	2,838	96.7	3.3			6.40	2.85
Spink	39	10,642	56.4	33.3	10.3		1.58	1.41
Brown	58	14,341	87.9	10.3	1.8		2.09	1.71
Marshall	14	3,770	85.7	14.3			2.23	1.94
Day	22	4,073	90.9	9.1			2.48	1.99
Roberts	9	1,580	88.9		11.1		1.82	1.28
Total	195	39,344	84.6	12.3	3.1		2.28	1.82
North Dakota:								
Dickey	28	6,154	100.0				2.68	1.84
Sargent	14	3,245	100.0				2.03	1.39
Cass	22	9,523	100.0				2.10	1.77
Traill	19	4,024	100.0				1.69	1.42
Grand Forks	26	6,625	100.0				1.63	1.43
Walsh	17	3,032	100.0				2.43	1.78
Pembina	21	5,455	100.0				2.03	1.49
Barnes	7	1,670	100.0				2.97	2.39
Stutsman	42	13,258	100.0				1.42	1.09
Foster	16	5,955	100.0				1.87	1.58
Eddy	11	4,810	100.0				1.30	.91
Griggs	10	4,680	100.0				2.38	1.73
Benson	20	8,120	100.0				1.19	.94
Ramsey	23	7,510	100.0				2.08	1.73
Towner	13	5,100	100.0				1.58	1.22

TABLE III.—*Amount of labor used per 100 acres of grain harvested on farms using binders, headers, and combines, by States and counties*—Continued.

States and counties.	Number of farms.	Total acreage of small grain.	Percentage of farms which used specified harvesting machinery.				Total amount of man labor per 100 acres harvested of—	
			Binder.	Header.	Binder and header.	Combine.	Wheat.	Small grain.
North Dakota—Continued.								
Cavalier	38	10,935	100.0				1.94	1.27
Pierce	22	6,744	100.0				1.64	1.01
Total	349	106,840	100.0				1.85	1.40
Minnesota:								
Big Stone	17	2,721	100.0				3.01	2.02
Stevens	4	542	100.0				2.60	1.66
Polk	29	7,113	100.0				2.90	1.91
Marshall	18	5,760	100.0				1.88	1.29
Kittson	4	760	100.0				1.40	1.04
Total	72	16,896	100.0				2.50	1.69
Grand total	1,291	313,691	67.9	25.7	3.8	2.6	1.85	1.57

TABLE IV.—*Average wages per day paid with board for harvest labor in certain States and counties of the wheat belt, 1919–1921.*

[See also figs. 10, 11, 12.]

OKLAHOMA.

Counties.	1919	1920	1921	Counties.	1919	1920	1921
Adair	$2.00	$3.17	$1.95	Jackson	$5.00	$5.21	$2.65
Alfalfa	6.00	5.71	4.10	Jefferson	4.00	4.00	1.88
Beaver	6.00	5.38	4.20	Kay	5.00	5.81	3.35
Beckham	4.00	4.75	2.50	Kingfisher	5.00	5.83	3.45
Blaine	6.00	6.40	3.25	Kiowa	5.00	5.12	2.95
Caddo	4.00	4.50	2.55	Logan	4.00	5.75	2.75
Canadian	4.00	5.66	2.60	McClain	3.00	4.25	1.75
Cherokee	2.00	3.00	1.85	Major	5.00	6.50	4.00
Cimarron	5.00	5.50	3.70	Mayes	3.00	3.75	1.93
Cleveland	4.00	4.50	2.45	Noble	5.00	6.00	3.40
Comanche	6.00	4.71	2.60	Nowata	4.00	4.12	2.50
Cotton	7.00	5.29	2.65	Oklahoma	4.00	5.60	3.35
Craig	4.00	3.79	2.00	Ottawa	4.00	3.92	1.95
Custer	4.00	5.65	3.17	Roger Mills	4.00	4.56	4.08
Delaware	3.00	3.17	2.07	Rogers	3.00	4.00	2.22
Dewey	5.00	6.00	3.00	Stephens	4.00	4.50	2.00
Ellis	5.00	6.40	4.15	Texas	6.00	6.50	4.10
Garfield	5.00	5.80	3.75	Tillman	5.00	5.06	2.75
Garvin	4.00	3.00	2.27	Tulsa	5.00	5.30	2.60
Grady	4.00	3.75	2.30	Wagoner	3.00	3.78	1.81
Grant	5.00	5.79	4.00	Washington	4.00	4.42	2.61
Greer	4.00	4.50	3.20	Washita	5.00	5.50	2.83
Harmon	4.00	5.00	2.60	Woods	6.00	6.60	4.60
Harper	5.00	5.40	3.90	Woodward	5.00	5.25	3.70

KANSAS.

Allen	$4.83	$4.75	$2.50	Clay	$5.07	$7.33	$3.75
Anderson	4.38	5.25	2.85	Cloud	5.00	6.64	4.15
Atchison	5.48	5.38	3.35	Coffey	5.33	5.17	3.65
Barber	5.75	6.08	4.40	Comanche	6.00	7.00	4.65
Barton	7.16	7.21	5.05	Cowley	5.29	5.40	3.45
Bourbon	4.60	3.55	2.35	Crawford	5.00	5.33	2.85
Brown	5.20	6.30	3.10	Decatur	6.35	7.25	5.15
Butler	5.10	5.36	3.50	Dickinson	5.00	6.00	3.95
Chase	4.86	4.50	3.40	Doniphan	4.50	5.07	2.80
Chautauqua	4.67	3.50	2.85	Douglas	4.92	5.42	3.30
Cherokee	3.50	3.33	2.65	Edwards	6.42	7.25	5.35
Cheyenne	6.00	7.10	3.80	Elk	5.00	4.50	2.40
Clark	6.00	6.00	5.00	Ellis	8.21	8.80	5.00

TABLE IV.—*Average wages per day paid with board for harvest labor in certain States and counties of the wheat belt, 1919–1921*—Continued.

KANSAS—Continued.

Counties.	1919	1920	1921	Counties.	1919	1920	1921
Ellsworth	$7.28	$8.00	$5.05	Neosho	$4.67	$5.00	$2.55
Finney	5.30	6.88	4.00	Ness	6.00	7.00	5.15
Ford	7.00	7.12	5.25	Norton	5.92	7.50	4.90
Franklin	4.65	5.12	3.00	Osage	4.71	5.33	3.65
Geary	5.30	5.70	3.90	Osborne	6.10	6.67	4.80
Gove	7.14	7.00	5.50	Ottawa	5.44	7.00	4.40
Graham	5.95	7.25	5.05	Pawnee	6.25	8.00	5.00
Grant	5.75	5.00	3.00	Phillips	6.29	7.00	4.40
Gray	5.80	7.00	4.75	Pottawatomie	4.61	4.00	2.80
Greenwood	4.38	4.43	3.15	Pratt	5.90	6.50	4.75
Hamilton	2.75	4.00	.....	Rawlins	6.93	7.38	4.20
Harper	5.75	5.25	4.10	Reno	6.14	6.25	4.20
Harvey	5.00	5.00	3.85	Republic	5.08	5.60	3.55
Haskell	6.67	7.62	4.90	Rice	6.30	7.07	5.25
Hodgeman	6.50	7.00	5.65	Riley	5.00	6.00	3.20
Jackson	4.75	5.30	3.45	Rooks	6.75	7.00	5.00
Jefferson	4.86	5.83	3.10	Rush	7.06	7.20	5.50
Jewell	5.21	5.67	4.10	Russell	7.67	6.33	4.70
Johnson	5.00	5.00	3.85	Saline	5.85	7.00	4.25
Kearny	4.25	6.00	5.00	Scott	5.25	7.00	4.00
Kingman	5.60	5.80	4.15	Sedgwick	5.20	5.64	3.80
Kiowa	6.50	7.83	5.30	Seward	6.00	7.75	4.75
Labette	4.42	4.08	2.90	Shawnee	4.33	5.75	3.45
Lane	6.25	7.25	5.35	Sheridan	7.13	7.50	5.00
Leavenworth	4.71	6.33	3.30	Sherman	6.17	7.00	4.15
Lincoln	6.50	7.56	5.05	Smith	6.13	6.80	3.95
Linn	4.94	4.50	2.75	Stafford	6.60	7.33	5.35
Logan	5.33	7.33	4.40	Stanton	3.00	4.00	.....
Lyon	5.00	5.00	3.75	Stevens	5.00	7.00	4.75
McPherson	6.02	6.80	4.10	Sumner	5.07	5.36	4.15
Marion	5.33	5.90	3.95	Thomas	6.90	4.00	4.30
Marshall	5.06	6.00	3.35	Trego	7.50	8.19	5.15
Meade	6.30	7.50	5.20	Wabaunsee	5.00	5.60	3.50
Miami	5.11	5.17	3.20	Wallace	4.50	6.50	4.00
Mitchell	5.80	6.80	4.65	Washington	5.00	6.00	3.50
Montgomery	4.33	4.50	2.35	Wichita	.....	7.00	3.00
Morris	5.07	6.00	3.65	Wilson	4.94	4.75	2.60
Morton	5.00	5.75	3.50	Woodson	4.50	5.17	2.50
Nemaha	4.50	5.09	3.05	Wyandotte	5.00	5.40	2.75

NEBRASKA.

Adams	$6.00	$6.75	$3.62	Gosper	$5.50	$6.75	$3.35
Antelope	4.16	4.00	2.44	Grant	3.50	.....	2.00
Arthur	5.00	3.00	2.00	Greeley	3.75	5.50	2.00
Banner	5.25	.....	3.00	Hall	4.93	5.08	3.12
Blaine	.....	.....	1.50	Hamilton	6.00	6.70	3.40
Boone	5.62	5.00	2.70	Harlan	5.70	6.25	3.83
Box Butte	5.00	5.75	3.30	Hayes	7.00	.....	3.25
Boyd	4.50	5.22	2.35	Hitchcock	6.42	7.25	4.21
Brown	4.30	4.60	2.50	Holt	3.90	4.50	2.30
Buffalo	5.35	5.37	3.00	Hooker	5.00	.....	2.75
Burt	4.60	5.07	3.40	Howard	6.50	6.50	3.00
Butler	5.16	6.00	2.93	Jefferson	5.60	6.00	3.60
Cass	5.20	6.08	3.37	Johnson	5.00	6.33	2.95
Cedar	4.85	5.50	2.50	Kearney	5.90	6.75	4.37
Chase	6.65	7.00	4.06	Keith	5.50	6.50	3.25
Cherry	3.35	3.75	2.00	Keyapaha	3.85	4.00	2.05
Cheyenne	5.21	6.57	3.08	Kimball	5.00	6.60	3.12
Clay	5.40	6.50	3.96	Knox	4.92	5.25	2.90
Colfax	5.06	5.66	2.75	Lancaster	5.00	5.50	3.10
Cuming	5.00	4.80	2.99	Lincoln	4.90	6.50	3.06
Custer	5.15	6.57	2.21	Logan	4.25	5.00	2.50
Dakota	5.25	5.50	2.60	Loup	.....	.....	2.00
Dawes	5.00	4.75	2.83	McPherson	.....	7.00	2.00
Dawson	5.58	6.25	3.13	Madison	4.50	4.66	2.87
Deuel	5.56	6.82	3.08	Merrick	4.70	7.00	3.00
Dixon	5.00	5.50	2.90	Morrill	4.90	5.50	3.00
Dodge	5.78	6.12	3.41	Nance	4.33	5.62	2.67
Douglas	4.50	7.75	2.50	Nemaha	5.00	6.00	3.40
Dundy	6.75	7.42	4.50	Nuckolls	5.40	6.20	3.65
Fillmore	5.50	6.20	3.30	Otoe	5.32	5.40	2.60
Franklin	5.50	6.70	3.75	Pawnee	5.35	5.25	3.50
Frontier	5.60	6.83	3.50	Perkins	6.65	7.87	3.19
Furnas	5.90	7.37	3.35	Phelps	5.50	6.58	3.81
Gage	5.00	5.50	3.08	Pierce	5.66	5.00	2.33
Garden	5.16	6.12	3.00	Platte	4.66	5.68	2.85
Garfield	5.30	4.50	3.50	Polk	5.60	7.90	3.25

TABLE IV.—*Averages wages per day paid with board for harvest labor in certain States and counties of the wheat belt, 1919–1921*—Continued.

NEBRASKA—Continued.

Counties.	1919	1920	1921	Counties.	1919	1920	1921
Redwillow	$6.00	$7.91	$4.50	Stanton	$6.00	.....	$2.00
Richardson	5.00	.....	3.25	Thayer	5.25	$6.16	3.30
Rock	.....	3.50	2.00	Thomas	3.00	4.50	.....
Saline	5.37	6.00	4.00	Thurston	.....	4.67	3.00
Sarpy	5.00	5.00	2.75	Valley	.....	5.75	2.75
Saunders	5.50	6.75	3.00	Washington	4.83	5.60	2.95
Scotts Bluff	4.14	6.20	3.19	Wayne	5.25	5.25	3.00
Seward	5.21	6.00	3.75	Webster	5.60	7.00	3.71
Sheridan	4.65	5.00	2.25	Wheeler	5.00	.....	2.75
Sherman	6.00	5.25	3.00	York	5.78	6.93	3.14
Sioux	3.75	4.00	1.87				

SOUTH DAKOTA.

Aurora	$5.33	$5.00	.....	Hyde	$6.00	$5.80	$5.00
Beadle	5.40	5.50	$3.06	Jackson	3.50	5.50	3.00
Bon Homme	5.00	5.25	2.25	Jerauld	5.00	4.00	2.80
Brookings	5.33	5.40	2.64	Jones	4.80	5.00	2.00
Brown	5.15	6.75	3.33	Kingsbury	5.00	6.25	3.00
Brule	4.66	5.50	2.75	Lake	5.00	5.00	2.75
Buffalo	.....	.....	3.00	Lawrence	.....	4.75	2.17
Butte	4.37	4.50	.....	Lincoln	5.50	6.00	3.25
Campbell	5.50	7.10	3.40	Lyman	5.00	5.00	2.90
Charles Mix	5.75	5.15	2.90	McCook	5.00	5.65	2.50
Clark	5.00	6.10	2.90	McPherson	5.00	6.25	3.88
Clay	5.25	6.00	3.00	Marshall	4.85	7.60	3.50
Codington	5.00	5.50	2.80	Meade	4.50	.....	2.15
Corson	4.33	5.80	3.25	Mellette	6.00	5.50	2.80
Custer	3.00	4.50	2.00	Miner	5.20	5.50	2.60
Davidson	5.00	5.25	2.75	Minnehaha	5.50	7.00	2.70
Day	5.33	5.25	2.95	Moody	5.00	5.35	2.50
Deuel	5.00	5.25	2.62	Pennington	3.00	4.00	2.30
Dewey	5.50	6.35	2.80	Perkins	5.00	4.00	3.00
Douglas	5.00	5.65	3.00	Potter	4.75	6.58	3.00
Edmunds	5.00	5.65	4.00	Roberts	5.00	5.75	3.06
Fall River	5.00	5.00	3.40	Sanborn	5.00	5.00	2.90
Faulk	5.50	6.00	3.33	Spink	5.50	5.95	3.16
Grant	4.88	5.60	2.92	Stanley	5.00	.....	2.30
Gregory	5.40	5.10	3.25	Sully	6.00	5.25	4.00
Haakon	4.00	5.00	2.66	Tripp	6.00	4.50	2.80
Hamlin	6.66	6.10	3.06	Turner	5.33	6.00	2.50
Hand	5.00	5.50	2.75	Union	5.00	5.00	2.85
Hanson	5.00	5.00	3.00	Walworth	.....	6.50	3.00
Harding	4.00	5.25	2.66	Yankton	5.00	6.00	2.50
Hughes	4.50	.....	3.00	Ziebach	3.00	.....	.....
Hutchinson	5.50	5.65	3.25				

NORTH DAKOTA.

Adams	$4.50	$6.00	$3.05	McLean	$4.50	$6.50	$3.35
Barnes	4.95	6.00	3.75	Mercer	4.50	6.50	3.65
Benson	5.40	6.50	4.25	Morton	4.50	5.85	3.20
Billings	4.00	5.50	3.15	Mountrail	4.50	6.25	4.25
Bottineau	4.60	6.10	3.60	Nelson	5.45	6.35	4.15
Bowman	4.60	6.00	3.10	Oliver	4.50	6.50	3.25
Burke	5.25	6.00	4.25	Pembina	5.60	6.25	4.25
Burleigh	4.60	6.00	3.25	Pierce	5.30	6.25	3.60
Cass	4.90	6.00	3.70	Ramsey	5.50	6.50	4.55
Cavalier	5.60	6.40	4.35	Ransom	4.75	6.00	3.75
Dickey	5.00	5.80	3.60	Renville	4.75	6.10	4.00
Divide	5.25	6.30	4.60	Richland	4.90	6.00	3.50
Dunn	4.50	6.00	3.25	Rolette	5.00	6.25	4.10
Eddy	5.00	6.50	4.00	Sargent	5.00	6.10	3.75
Emmons	4.75	6.10	3.25	Sheridan	4.75	6.40	3.50
Foster	5.00	6.50	3.75	Sioux	4.40	5.75	3.00
Golden Valley	4.30	5.50	3.25	Slope	4.60	5.75	3.15
Grand Forks	5.25	6.10	4.05	Stark	4.20	5.50	3.50
Grant	4.75	5.80	3.50	Steele	5.00	6.25	4.05
Griggs	5.00	6.50	4.00	Stutsman	4.75	6.40	3.85
Hettinger	4.60	6.00	3.20	Towner	5.25	6.25	4.15
Kidder	4.60	6.10	3.50	Traill	5.15	6.00	4.00
La Moure	5.10	6.00	3.50	Walsh	5.50	6.25	4.60
Logan	4.70	5.50	3.25	Ward	4.50	6.20	4.40
McHenry	4.50	6.15	3.25	Wells	5.00	6.50	4.20
McIntosh	4.85	5.90	3.15	Williams	4.60	5.75	4.00
McKenzie	4.00	5.50	4.00				

TABLE IV.—*Average wages per day paid with board for harvest labor in certain States and counties of the wheat belt, 1919–1921*—Continued.

MINNESOTA.

Counties.	1919	1920	1921	Counties.	1919	1920	1921
Becker	$4.00	$5.40	$2.87	Murray	$5.00	$6.00	$2.55
Big Stone	5.00	5.75	2.95	Nicollet	4.80	5.20	2.75
Blue Earth	4.50	5.25	2.75	Nobles	5.00	5.20	3.00
Brown	4.75	5.50	2.87	Norman	4.50	6.00	3.50
Carver	3.50	5.00	3.50	Olmsted	4.50	4.85	2.87
Chippewa	5.33	5.66	3.08	Otter Tail	4.00	5.00	3.00
Clay	5.00	6.00	3.10	Pennington	4.00	6.00	3.50
Clearwater	5.17	4.50	3.09	Pipestone	5.00	5.20	2.50
Cottonwood	5.00	5.30	2.65	Polk	4.75	6.00	4.00
Dakota	4.50	5.50	3.00	Pope	4.00	5.00	2.75
Dodge	4.00	5.00	2.90	Red Lake	4.00	5.75	3.50
Douglas	4.00	6.00	2.83	Redwood	5.00	5.60	3.08
Faribault	4.50	5.60	3.10	Renville	4.15	5.25	2.75
Fillmore	4.00	5.23	3.00	Rice	5.00	4.80	2.95
Freeborn	4.40	5.00	2.80	Rock	5.00	5.70	3.10
Goodhue	5.00	5.00	3.05	Roseau	4.00	4.75	3.50
Grant	4.00	6.00	3.25	Scott	4.50	5.17	3.20
Houston	4.00	5.00	2.85	Sibley	4.50	5.25	3.35
Hubbard	3.30	4.00	2.83	Stearns	4.00	4.75	2.88
Jackson	5.00	5.33	2.85	Steele	4.25	5.00	3.10
Kandiyohi	4.50	5.38	2.75	Stevens	4.58	5.70	3.00
Kittson	5.00	5.70	4.10	Swift	5.00	5.35	3.08
Lac qui Parle	5.00	5.83	3.30	Todd	3.60	.....	2.83
Le Sueur	4.70	5.60	3.20	Traverse	5.05	5.75	3.10
Lincoln	5.00	5.00	2.80	Wabasha	4.75	5.00	3.00
Lyon	5.00	5.60	2.74	Wadena	3.50	5.00	2.50
McLeod	5.00	5.50	3.25	Waseca	5.00	4.80	2.80
Mahnomen	4.50	5.00	3.10	Watonwan	4.50	5.20	3.00
Marshall	4.50	6.00	3.28	Wilkin	5.00	5.40	3.10
Martin	4.45	5.10	2.88	Winona	4.25	5.00	3.00
Meeker	4.00	5.33	3.75	Yellow Medicine	4.75	6.05	3.40
Mower	4.00	4.95	3.00				

ORGANIZATION OF THE UNITED STATES DEPARTMENT OF AGRICULTURE.

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